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Docketing No. 1391/1275

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:)	Appeal No. _____
)	
MICHAEL McHALE)	
GEORGE NICHTULA)	
CHRISTINE L. CORRIVEAU)	
WILLIAM WOKAS)	
)	
Serial No. 08/044,240)	Group Art Unit: 1302
)	
Filed: April 7, 1993)	Examiner: C. Sherrer
)	
For: MULTI-PHASE SHEETED)	
CHEWING GUM AND METHOD)	
AND APPARATUS FOR MAKING)	

APPLICANTS' BRIEF ON APPEAL

Honorable Commissioner of
Patents and Trademarks
Washington, D.C. 20231

Dear Sir:

Pursuant to the Notice of Appeal filed on October 9, 1995, Applicants respectfully submit three (3) original copies of this Brief on Appeal, for consideration by the Board of Patent Appeals and Interferences. The items 1) -9) are presented below in

the order set forth in 37 C.F.R. 1.192(c) and include
1) Real Party in Interest, 2) Related Appeals and
Interferences, 3) Status of Claims, 4) Status of
Amendments, 5) Summary of Invention, 6) Statement of
Issues, 7) Grouping of Claims, 8) Argument, and 9)
Appendices. For the sake of convenience, the following
i) Table of Contents and ii) Table of Authorities are
also included.

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1. REAL PARTY IN INTEREST

The real party in interest is the WM. WRIGLEY JR. COMPANY, the current assignee of the patent application.

2. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

3. STATUS OF THE CLAIMS

Claims 1-6, 8, 15-19, 21, 28, 51-54 and 56 are pending in this application. The pending claims are set forth in App. A. All of these claims stand rejected under 35 U.S.C. Section 103 as being obvious over Lorenz (German 3,516,852, App. B), or Cherukuri et al. (U.S. 4,971,806, App. C) in view of Lorenz.

Additionally, claims 7, 9-14, 20, 22-27 and 55 were withdrawn from consideration only due to a species restriction requirement. These claims, which would be allowable if the underlying base claims are allowed, are also included in App. A. Overall, App. A includes claims 1-28 and 51-56 in their present form.

4. STATUS OF AMENDMENTS

All amendments filed to date have been entered, including the Amendment filed by Applicants on July 14, 1995, which was submitted after the final rejection of the claims by the Examiner. In an Advisory Action dated July 24, 1995, the Examiner indicated that the

July 14 Amendment would be entered upon the filing of this appeal.

5. SUMMARY OF INVENTION

The invention is a multi-colored chewing gum product which includes a combination of a first chewing gum and a second confectionery material. As shown in Figs. 1 and 2, for instance, the second confectionery material (15) is embedded in the first chewing gum (13) so that the second confectionery material is visible in a pattern on a first surface of the multi-colored product, but is not visible from a second surface of the product. In all embodiments of the invention, the chewing gum product is in the form of a sheet, for instance a chewing gum stick (Figs. 5 and 6), or a disk-shaped sheet (Fig. 7), or a tape which can be rolled and unrolled (Fig. 1).

Referring to independent claim 1, the second mass is present in a pattern selected from the group consisting of an undulating pattern (Fig. 1), a pattern of stripes across a width of the product (Fig. 4), a diagonal pattern (Fig. 5), a pattern of bits (Figs. 6 and 7), and combinations thereof. Claim 51, the only other independent claim, focuses on the undulating pattern (Fig. 1). Claim 1 (but not claim 51) requires that the second confectionery material is visible only from the top surface of the product, along with the first mass, and that only the first mass is visible

from the bottom surface of the product. The claimed chewing gum products are made possible by a unique embedding process, which differs from prior art processes as explained below.

In the past, it has been known to produce multi-colored chewing gum products by a) coextruding together two or more streams of chewing gum having different colors, or b) forming different chewing gums into ropes, twisting the ropes together, and pressing the ropes into a sheet. In a coextrusion process, different molten chewing gum layers are combined in a single die, and extruded as a sheet. In a rope twisting process, the different ropes are formed separately before being combined. The prior art processes yielded multi-colored products in which a) both components contributed to the structural integrity of the product (and both components were chewing gum), and b) both components were visible from the opposite surfaces of the chewing gum product.

The products of the present invention differ in that only the first chewing gum component needs to have structural integrity because, as shown in Fig. 2, the first chewing gum component (13) generally surrounds the second confectionery material (15) on three sides. Put another way, the second confectionery material is "embedded" into the first chewing gum sheet, instead of being coextruded or twisted together with the first chewing gum sheet.

The embedding process, which forms the products of the invention, is much more versatile than prior art processes. Unlike the coextrusion and rope twisting processes which require both product components to have structural integrity (and compatible viscosities, in the case of coextrusion), the products of the invention are not so limited. So long as the first component is chewing gum, which possesses sufficient integrity, the second "embedded" component can be a wide variety of confectionery materials including taffy, marshmallow, chocolate nougats, gelatin and starch candy as well as chewing gum (specification, p.3, lines 19-22).

Furthermore, the embedding process, unlike coextrusion or rope twisting, can produce products in which the second confectionery material is deposited discontinuously as a pattern of "bits" (Figs. 6 and 7). Additionally, the embedding process can be used to provide continuous patterns of the second confectionery material which are not parallel to the direction of travel of the first chewing gum sheet, such as an undulating pattern visible from only one major surface of the product (Fig. 1) or a diagonal or cross-striped pattern visible from only one major surface of the product (Figs. 4 and 5). Again, because the second confectionery is visible from only one product surface, the second confectionery need not have structural integrity or a compatible viscosity or continuity.

The embedding process used to make the claimed products is illustrated in Figs. 8-20. As shown in Figs. 9 and 11, for instance, the first mass of chewing gum 81 is initially provided as a flat sheet or slab. The second mass of confectionery material can be provided as a plurality of ropes 83, which are guided toward the flat sheet 81 of chewing gum using guide rollers 95 and 101. The guide roller 101 can be oscillated back and forth in order to arrange the ropes in an undulating or other striped pattern on the flat sheet (specification, p. 10, lines 23-32 and p. 11, lines 1-9). Then, the ropes 83 are embedded into the sheet 81 using a pressing roller 106.

Alternatively, the second confectionery material can be arranged on the flat sheet as a pattern of bits as shown in Fig. 20, using the deposition roller 146 having openings 148 for depositing the bits. Then, the bits can be pressed into the flat sheet using a pressing roller such as the roller 106 in Fig. 10.

Applicants realize that the embedding process can be used to make a wide variety of products, some of which may resemble prior art products more closely than others. During prosecution, Applicants limited the claims to recite only specific product embodiments not disclosed or suggested by the prior art, and which are believed to be patentable.

6. STATEMENT OF ISSUES

The main issue presented for review is whether the final rejection of claims 1-6, 8, 15-19, 21, 28, 51-54 and 56 under 35 U.S.C. § 103 as being obvious over Lorenz (German 3,516,852, App. B) or, alternatively, over Cherukuri et al. (U.S. 4,971,806, App. C) in view of Lorenz, should be withdrawn.

Also presented for review is the issue of whether the restriction requirement as to species should be withdrawn. Species claims 7, 9-14, 20, 22-27 and 55 will be affected by this review.

A further issue presented for review is whether the withdrawn species claims should be allowed over the prior art.

7. GROUPING OF CLAIMS

Applicants request that the claims be grouped at least to the following extent:

Group A - Claims 1-6, 15-17, 21 and 28;

Group B - Claims 8 and 18-20; and

Group C - Claims 51-56.

The claims of Groups B and C are believed to be separately patentable from the claims of Group A because Groups B and C require the second confectionery material to be presented in an undulating pattern along a length of the first mass of chewing gum as shown, for example, in Fig. 1. The undulating pattern is a

distinct patentable feature not shown or suggested in the prior art, and can be produced by oscillating the guide roller 101 as shown in Fig. 11 and described at p. 5, lines 23-32 of the specification. Also, the oscillating feature is embodied in Example 1, which identifies the species elected in response to the restriction requirement. The claimed undulating pattern simply cannot be produced by the coextrusion or rope-twisting processes of the prior art, even if the prior art is modified, as discussed further in the arguments below which pertain to these claims. Therefore, the claims of Groups B and C should not stand or fall together with the more generic claims of Group A. (See 37 C.F.R. §§ 1.142(a) and 1.141(a)).

The claims of Group B are believed to be patentably distinct from the claims of Group C in that Group B claims (depending from claim 1) require that the second mass of confectionery material be visible from the top surface of the chewing gum product, along with the first mass of chewing gum, and that only the first mass be visible from the bottom surface of the chewing gum product. The feature of having the second mass visible from only one surface constitutes a separate patentable distinction as to the claimed undulating pattern for the reasons explained in the above Summary of the Invention. Specifically, this feature, which is not suggested in the prior art, allows the second mass of confectionery material a) to

lack structural integrity, b) to have a viscosity different from the first mass, and c) to be deposited discontinuously on the first mass, or in a continuous pattern not parallel to the direction of travel of the first mass. Accordingly, Applicants respectfully submit that the claims of Group B should not stand or fall together with those of Group C.

If the restriction requirement as to species is not sustained, then Applicants request that the species claims previously withdrawn from consideration be grouped as follows:

Group A - Claims 7, 9, 20, 22 and
27, in addition to the
claims listed above;

Group B - Claim 10, in addition to
the claims listed above;

Group C - Claim 55, in addition to
the claims listed above;
and

Group D (new) - Claims 11-14
and 23-26.

As to Group A, claim 7 (nonelected) differs from claims 5 and 6 (elected) only in that the elongated strip of chewing gum is cut into sticks. The Applicants do not understand, and the Examiner has not explained, why the Examiner ever considered claim 7 to be a separate invention from claims 5 and 6, and

withdrew it from consideration. Claim 20 should be also included in Group A for the same reason.

Claim 9 should be included in Group A because it is similar, but not identical to claim 4. Claim 22 should be included in Group A because it recites a method which would yield the product of claim 4. Claim 27 should be included in Group A because the use of a rolling compound on a chewing gum sheet (e.g. the first mass of chewing gum) is conventional.

Claim 10 should be included in Group B because it recites the undulating pattern recited in every other Group B claim. Claim 55 should be included in Group C because it depends from claim 51, and further requires only that the chewing gum product be in the form of a stick.

The claims of Group D (11-14 and 23-26) are believed to be separately patentable from the other three groups. Only the claims of Group D recite that the second confectionery material is present in a pattern of bits which, as shown in Figs. 6 and 7, is a discontinuous pattern. As explained in the above Summary of the Invention, the embedding of a discontinuous pattern of bits of second confectionery material in a first chewing gum sheet is not disclosed or suggested in the prior art (which focuses on coextrusion and rope twisting). Therefore, the claims of Group D should not stand or fall together with any other group of claims.

8. ARGUMENT

In the preceding section, Applicants have argued for a grouping of claims according to the specific patterns of the second confectionery material embedded in the first confectionery material. Specifically, the proposed Group A includes the generic claims and the claims directed to the products of Figs. 2 and 4 (having straight stripes), Group B includes claims directed to the product of Fig. 1 (having an undulating pattern), Group C includes claims directed products similar to Fig. 1 which (unlike Group B) do not require the second confectionery material to be visible only from the top surface, and Group D includes claims directed to the products of Figs. 6 and 7 (in which the second confectionery material is present as a pattern of bits).

The following argument is divided into five sections. First, the restriction requirement as to species is addressed, because the species restriction is not consistent with the proposed groupings of claims. Then, a separate argument is presented for each of the four groups of claims.

i) The Restriction Requirement As To Species
Should Be Withdrawn

In an Office Action dated December 27, 1993, the Examiner imposed various restriction requirements, including a requirement that Applicants elect a

particular species for further prosecution. The Examiner did not state which claims, or groups of claims, were believed to embody patentably distinct species. Instead, the Examiner merely referred to "the process or product associated with the procedure of Example 1" as examples of different species inventions.

The Applicants elected the product associated with Example 1, with traverse, because the species restriction requirement did not comply with M.P.E.P. §814 which states, in pertinent part:

A. Species
As pointed out in Ex parte Ljungstrom, 1905 C.D. 541, 119.0.6.2335, the particular limitations in the claims and the reasons why such limitations are considered to restrict the claims to a particular disclosed species should be mentioned if necessary to make the requirement clear.

Applicants traversed the species restriction on the ground that the Examiner provided no information or reason as to how he was grouping the species claims, or why any particular group of claims was considered patentably distinct from another. The process of Example 1, for instance, can be used to make many of the products shown in the drawings, including the products of Figs. 1, 4 and 5. The Example broadly covers a process which provides the first mass of chewing gum as a slab, and a second mass of chewing gum as a plurality of ropes.

The process of Example 1 uses an oscillator (roller 101, Fig. 9) to deposit the ropes (83 in an

angular pattern on the chewing gum slab (81). Using the oscillator, the ropes can be deposited in an undulating pattern (Fig. 1), or in a diagonal striped pattern (Fig. 5), or even in a cross-striped pattern (Fig. 4) if the angle of cutting is adjusted properly. While Example 1 discloses forming the chewing gum product as a tape (Fig. 1), a person skilled in the art would know that the tape can easily be cut or broken into individual chewing gum sticks (Fig. 5). Moreover, a consumer certainly would break off individual pieces when using the product.

In a subsequent Office Action dated May 10, 1994, the Examiner made the species restriction requirement final, and again refused to set forth a proper basis for the requirement. Additionally, the Examiner withdrew claims from consideration that were within the scope of the elected species (i.e., products which can be produced by the process of Example 1). For instance, the Examiner withdrew from consideration claims 7, 20 and 55, which recited the chewing gum product in the form of a stick. Although Example 1 focuses on producing a chewing gum tape (e.g., Fig. 1), the consumer must certainly separate the tape into sticks, either by hand or by biting, in order to use the product. The Examiner had no proper basis for withdrawing these claims from consideration, or for refusing to explain his grouping of claims.

Also, the Examiner withdrew from consideration claims 9-10 and 22, directed to diagonal patterns and methods of making which can readily be accomplished by the process of Example 1. Again, the Examiner had no proper basis for withdrawing these claims from consideration, or for refusing to explain his grouping of claims.

In summary, a) no proper species restriction requirement has been made or explained, and b) the species election made by Applicants in response to the restriction requirement has not been honored by the Examiner because he failed to consider all claims directed to products which can be made by the process of Example 1. Accordingly, this appeal should be decided without restriction as to species, and all claims set forth in App. A should be considered.

- ii) The Rejection Of Group A Claims 1-6, 15-17, 21 And 28 Under 35 U.S.C. §103 Should Be Withdrawn, And These Claims Should Be Allowed Along With Species-Restricted Claims 7, 9, 20, 22 and 27

Claims 1-6, 15-17, 21 and 28 (the claims of Group A) stand rejected under 35 U.S.C. §103 as being obvious over Lorenz (German 3,516,852, App. B) or, alternatively, over Cherukuri et al. (U.S. 4,971,806, App. C) in view of Lorenz. Applicants respectfully submit that these claims should be allowed, along with the species-restricted claims 7, 9, 20, 22 and 27.

Group A includes independent claim 1, and some of the claims depending from claim 1. The elements of claim 1 (App. A) can be broken down as follows:

A multi-colored, sheeted chewing gum product with a top and bottom surface, comprising:

a first mass of chewing gum formed in a generally flat sheet; and

a second mass of a confectionery product

- having a different color than the first mass,

- smaller than the first mass,

- and embedded in the first mass so as to be visible with the first mass from the top surface of the chewing gum product;

the second mass being present in a pattern selected from the group consisting of

- an undulating pattern,

- a pattern of stripes across a width of the product,

- a diagonal pattern,

- a pattern of bits, and

- combinations of the foregoing;

wherein the first mass only is visible from the bottom surface of the chewing gum product.

The German reference (App. B) discloses a coextrusion process for making chewing gum from a plurality of chewing gum streams (Figs. 5, 6). The different chewing gum streams merge and converge within a die (Figs. 5, 6) and exit the die downward as a tubular product having various patterns shown in cross-section (Fig. 7). It should be emphasized that no surface patterns of a chewing gum product are disclosed. Instead, the patterns shown in Fig. 7 only show a cross-sectional cut through the product, which is extruded as a tube having a square or circular cross-section (App. B, p. 5, lines 2-4). However, the surface patterns of the products can be imagined by rotating the coextruded products shown in Fig. 7 by 90 degrees in any direction, thus yielding elongated products having stripes which are parallel to the length of the products.

The German reference fails to disclose or suggest several features of claim 1. First, there is no disclosure of a sheeted chewing gum product, or of a first mass of chewing gum formed into a generally flat sheet. The term "sheet", for instance, would refer to any of the flat, relatively thin products shown in Applicants' Figs. 1-7. Instead, the reference discloses only tubular products having square or circular cross-section, i.e., which are too thick to be characterized as "sheets" (App. B, Fig. 7).

Second, the German reference fails to disclose or suggest a second mass of confectionery material embedded in the first mass in a pattern selected from a) an undulating pattern, as shown in Applicants' Fig. 1, b) a pattern of stripes across a width of the product, as shown in Applicants' Fig. 4, c) a diagonal pattern, as shown in Applicants' Fig. 5, or d) a pattern of bits, as shown in Applicants' Figs. 6 and 7. Instead, the only pattern which can result from the disclosed coextrusion process is a pattern of stripes parallel to the length of the product. Such a pattern is shown, for instance, in Applicants' Fig. 4, but is not within the scope of Applicants' claim 1.

Third, the German reference does not disclose or suggest a product in which a) first and second masses are visible from a top surface of the product, and b) only the first mass is visible from the bottom surface of the product. As explained in the above Summary of the Invention, this feature allows the first chewing gum mass to provide all the necessary structural integrity so that the second confectionery mass can be selected from a wide variety of confectionery materials. As shown in Fig. 7 of the German reference, all of the products which have first and second masses visible from one side, would also have first and second masses visible from the opposite side.

The Cherukuri et al. reference (App. C) also discloses a multi-layered chewing gum composition

formed by coextrusion. The Cherukuri et al. disclosure has the same deficiencies of the German reference with regard to the Applicants' invention, except that Cherukuri et al. does disclose roller pressing of the chewing gum layers, which would form a sheet (col. 2, lines 31-32). Additionally, Cherukuri et al. discloses another process in which ropes of different chewing gums are braided together and rolled into sheets (col. 9, lines 42-45). This latter process would inherently result in products having first and second masses visible from both opposing surfaces of the products. Both of the processes in Cherukuri et al. are limited to combining different chewing gums, and neither would be useful for combining chewing gum with another confectionery material having less independent structural integrity.

References relied upon to support an obviousness rejection must provide an enabling disclosure as to the claimed invention, and must place the claimed invention in the possession of the public. Beckman Instruments, Inc. v. LKB Produkter AB (App. D), 892 F.2d 1547, 1551 (Fed. Cir. 1989). Here, the references relied on by the Examiner do not enable a person skilled in the art to make the products of claim 1, namely, sheeted chewing gum products in which a first chewing gum mass and a second confectionery material are visible from a top surface of the product and only the first chewing gum mass is visible from a bottom surface of the

product. Also, the references do not enable a person skilled in the art to embed a second confectionery material into a first chewing gum mass, in any of the specific patterns recited in claim 1.

In the final Office Action dated May 12, 1995, the Examiner did not dispute that the prior art fails to disclose the specific claimed chewing gum products. Nevertheless, the Examiner stated that the prior art discloses the inlaying of one chewing gum layer within another, in a striped pattern, and alleged that such a pattern is known from BEECHNUT® chewing gum products. The BEECHNUT® products are admitted prior art on page 1, lines 27-29 of Applicants' specification. As explained on page 1, BEECHNUT® is printed with a dye to cause colored stripes and, therefore, does not involve the embedding of a second confectionery material within a first chewing gum mass, as claimed in claim 1. By definition, a dye merely adds color and is not considered to be a second "confectionery" material as defined on page 3, lines 19-22 of the specification.

The Examiner acknowledged that the claimed products "may not be able to be produced by the apparatus or processes disclosed by the prior art" (final Office Action, ¶4). This alone, illustrates that the requirement of an enabling disclosure is not satisfied by the prior art, and the obviousness rejection is improper. Beckman Instruments (App. D), 892 F.2d at 1551.

The Examiner further argued that the claimed products do not require the process disclosed in Applicants' specification, but could be made "by hand." Useful chewing gum products (typically made by forming hot, molten chewing gum into sheets which are rolled and cut) cannot be made "by hand" with any precision or commercial feasibility. Also, the Examiner has cited no prior art, in favor of this assertion. Where the alleged obviousness of an invention different from the prior art is predicated on the level of ordinary skill in the art, specific prior art evidence is needed to show what that level of skill was. In Re Kaplan (App. E), 789 F.2d 1574, 1580 (Fed. Cir. 1986). Because the Examiner provided no prior art showing the manufacture of sheeted chewing gum by hand, this cannot be used to support an obviousness rejection, and the rejection is improper for this additional reason.

Finally, the Examiner argued that the products produced by the prior art, depending on how they are cut into pieces, can be in the designs that are instantly claimed. However, as explained above, the German reference (App. B) discloses only an elongated tubular product and does not disclose a sheeted product. No matter how the tubes are cut into pieces, the resulting form will most likely be tubular and not sheeted. Alternatively, if thin cross-sectional wafers are cut having surfaces corresponding to Fig. 7 of the reference, the products will have first and second

masses passing through the waters and visible from both surfaces.

The Cherukuri et al. reference (App. C) contains no disclosure of any pattern in which a second confectionery mass is embedded in a first chewing gum mass so that both masses are visible from a top surface of the product and only the first chewing gum mass is visible from the bottom surface. Therefore, no matter how the products of Cherukuri et al. are cut, the claimed patterns cannot be made to appear.

Even if the prior art processes could be modified as suggested by the Examiner, to make the claimed products, this would not form the basis for an obviousness rejection unless the prior art suggested the desirability of such a modification. In Re Gordon (App. F), 733 F.2d 900, 902 (Fed. Cir. 1984); In Re Mills (App. G), 916 F.2d 680, 683 (Fed. Cir. 1990). Here, the prior art contains no suggestion of the desirability of embedding a second confectionery mass into a first chewing gum sheet, so that both the second confectionery and first chewing gum are visible from a top surface of the product and only the first chewing gum is visible from the bottom. Furthermore, it is considered that a person of ordinary skill in the art is one who thinks along the lines of conventional wisdom in the art, and is not one who undertakes to innovate in this fashion. Standard Oil Co. v. American Cyanamid Co. (App. H), 774 F.2d 448, 454 (Fed. Cir.

1985); Custom Accessories v. Jeffrey-Allan Industries (App. J), 807 F.2d 955, 962 (Fed. Cir. 1986).

Absent the required teaching or suggestion of the invention as a whole, the Examiner can do no more than piece the invention together by impermissible hindsight, using the claimed invention as a template. Texas Instruments v. U.S. Intern. Trade Comm'n. (App. J), 988 F.2d 1165, 1178 (Fed. Cir. 1993). In order to determine whether an invention is obvious, the invention must be viewed not from the blueprint drawn by the inventors, but from the state of the art existing when the invention was made. Interconnect Planning Corp. v. Feil (App. K), 774 F.2d 1132, 1138 (Fed. Cir. 1985). Applying the proper standards, the obviousness rejection should not be sustained, and the claims of Group A should be allowed.

- iii) The Rejection of Group B Claims 8 and 18-20 Under 35 U.S.C. § 103 Should Be Withdrawn, And These Claims Should Be Allowed Along With Species-Restricted Claim 10

Claims 8 and 18-20 (the claims of Group B) stand rejected under 35 U.S.C. § 1-3 as being obvious over the German reference (App. B) or, alternatively, over Cherukuri et al. (App. C) in view of the German reference. Applicants respectfully submit that these claims should be allowed, along with the species-restricted claim 10.

All of the claims in Group B depend from claim 1, whose patentability has been argued above in connection

with Group A. Therefore, the arguments as to the Group A claims are incorporated herein by reference, and are fully applicable to the Group B claims as well.

Additionally, the claims in Group B embody a further distinction over the prior art in that each claim recites that the second confectionery mass is present in an undulating pattern in the first chewing gum sheet. As shown in Fig. 1, the phrase "undulating pattern" refers to a pattern of stripes which are bent and wavy instead of straight. The undulating pattern is made by oscillating the distribution roller for the second confectionery mass back and forth across the first chewing gum sheet, as explained on page 10, lines 23-30, with reference to Fig. 11.

The claimed undulating pattern is believed to create a further patentable distinction because making the undulating pattern requires the use of an oscillator for distributing one of the confectionery materials relative to the other during deposition. The references cited by the Examiner, namely the German reference (App. B) and the Cherukuri et al. reference (App. C) do not suggest oscillating one confectionery mass relative to another. Furthermore, the claimed undulating pattern simply cannot be produced using the prior art coextrusion processes (in which different streams are combined within a fixed die before extrusion) or the rope-twisting process of Cherukuri et

al. (in which the ropes are joined before twisting and braiding).

Put another way, no amount of creative cutting or pressing, or other modification of the disclosed prior art processes, would yield the claimed undulating pattern. The distance between the invention and the prior art is far greater here than for the typical nonobvious invention where the prior art is not enabling or fails to suggest a modification. Beckman Instruments (App. D), 892 F.2d at 1551; In Re Gordon (App. F), 733 F.2d at 902. Due to the nature of the prior art processes, they cannot be modified to oscillate one stream of confectionery material relative to another, to provide the claimed undulating pattern.

Therefore, the obviousness rejection of the Group B claims should not be sustained, and these claims should be allowed a) for all of the same reasons as the Group A claims, and b) for the additional reason that the undulating pattern recited in the Group B claims is not disclosed or suggested in the prior art.

- iv) The Rejection Of Group C Claims 51-56 Under 35 U.S.C. § 103 Should Be Withdrawn, And These Claims Should Be Allowed Along With Species-Restricted Claim 55

Claims 51-56 (the claims of Group C) stand rejected under 35 U.S.C. § 103 as being obvious over the German reference (App. B) or, alternatively, over Cherukuri et al. (App. C) in view of the German reference. Applicants respectively submit that these

claims should be allowed along with species-restricted claim 55.

The claims of Group C include independent claim 51 and claims depending from claim 51. Claim 51 recites, inter alia, a rope of second confectionery material embedded into a slab of first chewing gum having first and second surfaces, with the rope being present in an undulating pattern. Claim 51 further recites that the embedded rope of second confectionery material is visible at the first flat surface in said undulating pattern.

Unlike the claims of Groups A and B, discussed above, the claims of Group C do not preclude the presence of second confectionery material at the second surface of the slab as well. For instance, it would be within the scope of Group C claims to have a rope of second confectionery material embedded into the first chewing gum slab, wherein the rope is thick enough to be visible at both surfaces of the slab.

Independent claim 51 differs from the prior art as follows. The German reference (App. B) discloses bringing different streams of chewing gum together using a multi-channel fixed die, as shown in Figs. 5 and 6. The streams are combined within the die, and exit the die as a single chewing gum tube having a square or circular cross-section as shown in Fig. 7. Because the die is fixed, and all streams combine within the die, it is not possible to oscillate one

confectionery stream in the German reference relative to the others. Therefore, it is not possible to produce the claimed undulating pattern, illustrated in Applicants' Fig. 1, using the prior art process.

The Cherukuri et al. reference (App. C) is even further removed from the invention of claim 51. In addition to failing to suggest the claimed undulating pattern, Cherukuri et al. also fails to suggest the claimed embedding of a rope of second confectionery material into a first chewing gum slab. Instead, this reference appears to focus on a standard coextrusion process in which two or more layers are laminated side-by-side (i.e., are not embedded in one another), and a rope twisting process in which different chewing gum ropes are positioned adjacent to each other and braided (App. C, col. 2, lines 31-32 and col. 9, lines 42-48).

As with the Group B claims, the distance between the Group C claims and the prior art is far greater than for the typical nonobvious invention where the prior art is merely nonenabling, or fails to suggest a modification. Beckman Instruments (App. D), 892 F.2d at 1551; In Re Gordon (App. F), 733 F.2d at 902. Again, due to the nature of the prior art processes, they simply cannot be modified to oscillate one stream of confectionery material relative to another, to provide the claimed undulating pattern.

v) The Species-Restricted Claims 11-14 And 23-26
Of Group D Should Also Be Allowed

The species-restricted claims 11-14 and 23-26 of Group D all depend from claim 1, whose patentability has been argued above in connection with Group A. Therefore, the above arguments as to Group A are incorporated herein by reference, and are fully applicable to the Group D claims as well.

Additionally, the claims of Group D embody a further distinction over the prior art in that each claim recites that the second confectionery mass is present in a pattern of bits in the first chewing gum sheet. As shown in Figs. 6 and 7, the phrase "pattern of bits" refers to a discontinuous pattern in which the second mass is present as a pattern of separate, distinct droplets or domains within the first chewing gum sheet. The pattern of bits is applied using the porous deposition roller 146 shown in Fig. 20, which has a plurality of deposition openings 148.

The claimed pattern of bits is believed to create a further patentable distinction because making this pattern requires a porous deposition roller or another mechanism capable of depositing discrete domains or droplets of the second confectionery material onto the first chewing gum sheet prior to or simultaneous with the embedding. The references cited by the Examiner, namely the German reference (App. B) and the Cherukuri et al. reference (App. C) do not suggest any device for providing a second confectionery material in a

discontinuous pattern of discrete bits, relative to a chewing gum sheet. Furthermore, the claimed pattern of bits simply cannot be produced by the prior art coextrusion processes (in which the different streams are inherently continuous, as in a continuous tape or rope) or by the rope-twisting process of Cherukuri et al. (in which the different ropes are also continuous).

Put another way, no amount of creative cutting or pressing, or other modification of the disclosed prior art processes, would yield a product having the claimed pattern of bits embedded in and visible from only one surface of the product. Again, the distance between the Group D claims and the prior art is far greater than for the typical nonobvious invention where the prior art is not enabling or fails to suggest a modification or motive. Beckman Instruments (App. D), 892 F.2d at 1551; In Re Gordon (App. F), 733 F.2d at 902. Again, the prior art processes simply cannot be used to make the claimed products.

Therefore, the species-restricted claims of Group D should be allowed a) for all of the same reasons as the Group A claims, and b) for the additional reason that the pattern of bits recited in the Group D claims is not disclosed or suggested in the prior art.

9. APPENDICES

In order to aid the Board of Appeals in deciding this case, Applicants are pleased to provide the following Appendices with this brief.

APPENDIX

IDENTIFICATION OF APPENDIX

A	Claims On Appeal
B	German No. DE 3,516,852
C	U.S. Patent 4,971,806
D	<u>Beckman Instruments, Inc. v. LKB Produkt AB</u> , 892 F.2d 1547 (Fed. Cir. 1989)
E	<u>In Re Kaplan</u> , 789 F.2d 1574 (Fed. Cir. 1986)
F	<u>In Re Gordon</u> , 733 F.2d 900 (Fed. Cir. 1984)
G	<u>In Re Mills</u> , 916 F.2d 680 (Fed. Cir. 1990)
H	<u>Standard Oil Co. v. American Cyanamid Co.</u> , 774 F.2d 448 (Fed. Cir. 1985)
I	<u>Custom Accessories v. Jeffrey- Allan Industries</u> , 807 F.2d 955 (Fed. Cir. 1986)

APPENDIX

J

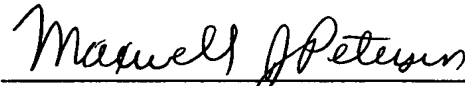
IDENTIFICATION OF APPENDIX

Texas Instruments v. U.S. Intern.
Trade Comm'n., 988 F.2d 1165 (Fed.
Cir. 1993)

K

Interconnect Planning Corp. v.
Feil, 774 F.2d 1132 (Fed. Cir.
1985)

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A

APPENDIX A: CLAIMS ON APPEAL

The following claims are presented in their current form, after inclusion of all amendments.

1. A multi-colored, sheeted chewing gum product with a top and bottom surface, comprising:

a first mass of chewing gum formed in a generally flat sheet; and

a second mass of a confectionery product having a different color than the first mass, smaller than the first mass, and embedded in the first mass so as to be visible with the first mass from the top surface of the chewing gum product;

the second mass being present in a pattern selected from the group consisting of an undulating pattern, a pattern of stripes across a width of the product, a diagonal pattern, a pattern of bits, and combinations of the foregoing;

wherein the first mass only is visible from the bottom surface of the chewing gum product.

[Note: The following claims 2-14 were amended on July 25, 1994, to include the words "chewing gum" before "product" in line 1 of each claim. The added language was inadvertently omitted in a later presentation of some of these claims, but was not deleted, and is therefore included below.]

2. The chewing gum product of claim 1 wherein the confectionery product is chewing gum.

3. The chewing gum product of claim 2 wherein the first and second masses of chewing gum are different flavors.

4. The chewing gum product of claim 1, wherein the second mass is present in a pattern of stripes across the first mass.

5. The chewing gum product of claim 1 wherein the first mass is formed into an elongated strip.

6. The chewing gum product of claim 5 wherein the strip in the form of a rolled up tape.

7. The chewing gum product of claim 5 wherein the strip is in the form of a flat stick of chewing gum.

8. The chewing gum product of claim 5, 6 or 7 wherein the second mass is present in an undulating pattern along a length of the first mass of chewing gum.

9. The chewing gum product of claim 1 wherein the second mass is present in a striped diagonal pattern across the product.

10. The chewing gum product of claim 1 wherein the second mass is present in an undulating pattern.

11. The chewing gum product of claim 1 wherein the second mass is present in a pattern of bits.

12. The chewing gum product of claim 11 wherein the bits are formed with generally uniform shapes and sizes.

13. The chewing gum product of claim 11 wherein the bits are formed with nonuniform shapes and sizes.

14. The chewing gum product of claim 11 wherein the first mass of chewing gum is formed into a disk shape.

15. The multi-phase chewing gum product of claim 1, prepared according to a method comprising the steps of:

forming the first mass of chewing gum into a slab with a generally flat surface;

forming the second mass of the confectionery product into at least one piece;

bringing the piece into contact with the flat surface;

pressing the slab and piece to form the generally flat sheet; and

cutting said generally flat sheet into segments of a desired width, length and shape.

16. The chewing gum product of claim 15 wherein the second mass is formed into at least one continuous rope which is laid on the flat surface as the slab passes beneath.

17. The chewing gum product of claim 16 wherein a plurality of ropes are laid on top of the slab in a direction generally parallel to the length of the slab.

18. The chewing gum product of claim 17 wherein a plurality of ropes are laid in a generally undulating pattern.

19. The chewing gum product of claim 18 wherein the undulating pattern is produced by oscillating the ropes a desired distance across the width of the slab as the ropes are laid on the slab.

20. The chewing gum product of claim 18 or 19 wherein the generally flat sheet is cut into sticks of chewing gum.

21. The chewing gum product of claim 18 or 19 wherein the generally flat sheet is formed into a plurality of rolled tapes.

22. The chewing gum product of claim 16 wherein a plurality of ropes are laid in a direction generally transverse to the length of the continuous slab.

23. The chewing gum product of claim 15 wherein the second mass is formed into a plurality of particles which are laid on the slab as it passes beneath.

24. The chewing gum product of claim 23 wherein the particles are of a generally uniform size and shape.

25. The chewing gum product of claim 23 wherein the particles are nonuniform in size and shape.

26. The chewing gum product of claim 23 wherein the generally flat sheet is cut into a plurality of disks.

27. The chewing gum product of claim 15 wherein a rolling compound is placed between the first mass of chewing gum and the second mass of confectionery material so that the two are separable by the consumer.

28. The chewing gum product of claim 15 wherein no rolling compound is placed between the first mass of chewing gum and the second mass of confectionery material so that the two are not separable by the consumer.

51. A multi-colored, sheeted chewing gum product, comprising:

 a slab of a first chewing gum having a first flat surface and a second surface; and

 a rope of a second confectionery material embedded into the slab of first chewing gum;

 the rope being present in an undulating pattern;

wherein the embedded rope of second confectionery material is visible at the first flat surface in said undulating pattern.

52. The product of claim 51, wherein the second confectionery material comprises a second chewing gum.

53. The product of claim 51, wherein the second confectionery material has a different color than the first chewing gum.

54. The product of claim 51, wherein the slab is in the form of a rolled up tape.

55. The product of claim 51, wherein the slab is in the form of a chewing gum stick.

56. The product of claim 51, prepared according to a method comprising the step of:

forming a mass of first chewing gum into a slab having a first generally flat surface;

forming a rope of second confectionery material; and
pressing the rope into the slab.

B

PTO-94-576

Germany, OLS
No. DE 35 16 852 A1

LORENZ

MULTICHANNEL COMPACT EXTRUDER FOR PASTES, ESPECIALLY FOR CHEWING GUM
PASTES

[Merkanal-Kompaktextruder fuer pastoese Stoffe, insbesondere fuer
Kaumassen]

Gérard Towae

UNITED STATES PATENT AND TRADEMARK OFFICE
Washington, D.C. November, 1994

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- (22) Date of application: May 10, 1985
- (43) Date of publication: November 14, 1985
- (71) Applicant: Société Togum, SA
- (72) Inventor: Gérard Towae
- (54) MULTICHANNEL COMPACT EXTRUDER FOR PASTES, ESPECIALLY FOR CHEWING GUM PASTES

PATENT CLAIMS

/1*

1. Compact extruder with several channels for paste products consisting of a feed unit (1) that consists of a group of funnels, each with a subsequent introduction device (5), and a screw press along a compression channel (14); characterized in that each channel (14) ends in a single chamber (16), (17), (18) in a compression block. Each chamber is designed to provide inflow parallel to the direction of compression and vertical outflow by adapted nozzles (27), (28) and (29) in a vertical sequence with ejection passages offset from each other.

2. Extruder according to claim 1, characterized in that ejection passage (32) is offset the most from the middle nozzle.

3. Extruder according to claim 1, characterized in that the product temperature is maintained at the top and bottom in the injection head in each area close to the product by the concomitant action of sealed electric resistors (35,36) and the circulation of a cooled medium along a cooling circuit (37) that is connected to an inner distribution system.

4. Extruder according to claims 1 and 3, characterized in that the temperature in the middle is maintained by an annular, sealed electrical resistor (38).

5. Extruder according to claims 1 and 3, characterized in that the temperature is regulated by an external circuit using the data from thermal sensors such as (39) contacting with the product close to each regulated area.

*Numbers in the margin indicate pagination in the foreign text.

MULTICHANNEL COMPACT EXTRUDER FOR PASTES, ESPECIALLY FOR
CHEWING GUM PASTES

/3

The present invention concerns a compact extruder with several channels for pastes, especially for chewing gum pastes and other substances that are semifluid when processed warm.

Manufacturers and consumers require products with several tastes, i.e., colors, for reasons of presentation and enjoyment. These multilayer products offer substantial advantages beyond the advantage of mixture or sequential tastes.

Accordingly, the product can appear more appealing due to the sequence of colors on the side surface directly visible through glass containers or transparent packaging. In addition, color sequences that can be created on the surface create the impression of other geometrical shapes that are difficult or impossible with presently-available devices.

Depending on these products and the manner of later processing, wrappers can be dispensed with.

Finally, this kind of product, in great demand at present, allows /4 manufacturers of processing machines to construct machines with greater output which are easier to operate and service.

There are, of course, extruder heads that fabricate two-color strands using two coupled extruders with a subsequent connecting piece. This type of device is based on a difficult, cumbersome, impractical and expensive technology.

The invention is based on the problem of offering a very practical

extruder with a high output to manufacture multicolor compound products without theoretically limiting the number of colors and shapes.

To this end, the extruder according to the invention consists of a unit for supplying and preparing the product, a compressing unit, a compressing chamber and a multiple extrusion head with exchangeable nozzles.

The extruder head design allows the easy exchange of extruder nozzles for maintenance, or to only change the shapes.

Servicing and cleaning tasks are easy to carry out due to the simple construction.

In addition, thermal regulation with circuits for heating and cooling ensure the optimum conditions for processing the product.

Because the space requirement is small, the extrusion head can be used with extruded forms with small diameters.

On the other hand, the product outflow at a right angle to inflow and perpendicular the floor prevents any initial deformation stress during strand fabrication, which arise even in the best of conditions.

The detailed technical features of the invention and the further advantages are set forth in the subsequent description drawn up as a non-binding example with reference to the accompanying drawing.

- Fig. 1 Cross section of the feed unit.
- Fig. 2 Top view of the feed unit and compressing unit.
- Fig. 3 Front view of the output of the compressing units.
- Fig. 4 Partial top view and partial lengthwise section of the compression chamber.
- Fig. 5 and 6 Cross sections of the extruder head with two or

/6

three channels.

Fig. 7 Schematic representation of examples of the shapes of possible theoretical flat cross sections with the multichannel extruder according to the invention.

In the following, the multichannel extruder will be described according to the invention for a three-color extruder head. The technology used is suitable for more colors. The only limitation is a practical one.

The extruder is installed in a line of equipment to shape the chewing gum paste or another paste product. The product is entered warm, manually or by hand, into a feed unit (1) that consists of a group of three individual funnels (2,3,4).

In their bottom portion, each funnel contains a feed device (5) /7 consisting of two corrugated rollers (6,7) that press the product down into the compression unit (8). The compression unit consists of three screw presses (9,10,11) at the pyramidal base of each funnel.

This arrangement can be seen more clearly in Fig. 2 in which the corrugated rollers can be seen in front of each feed device. The screw presses each consist of two adjacent compression screws (12,13) whose threads mesh in the middle. The screws fill the entire cross section of each compression channel (14) that ends in a feed gap (15) and is connected to individual compression chambers (16,17,18) from the actual compression chamber (19). The individual compression chambers are designed with inflow parallel to the compression direction and with vertical outflow.

Illustrating this in the following are Fig. 4, 5 and 6, which

represent a special design of the compression chamber (19) and extruder head (20).

The compression channels end at a front block (21) that is fixed to block (22) of the compression area. This front block (21) contains several top and bottom covers such as (23) over channels (14).

As shown in Fig. 5 and 6 in particular, each channel (14) is connected with its own compression chamber (16,17,18). The inlets into these areas are parallel and in the same plane via the front block (21). /8

The channels continue in the block with the compression area (19) by frusticonical connections (24,25,26) to their individual compression chambers (16,17,18), which are in a vertical sequence.

Each compression chamber is formed by a top ring section and a frusticonical main section. The main sections in the block border the extrusion head and/or the neighboring areas. The chambers are identified by the hatch-marked walls of the nozzles (27,28,29). These nozzles are offset from each other and possess concentric ejection passages (30, 31, 32) that are slightly offset from each other. The middle ejection passage is offset the most to ensure that the tubular or sectional individual layers connect well with each other at the outlet and hence form a homogenous product.

The actual nozzles, which are generally funnel-shaped, are flanged on the top and in the middle on the inside by the extruder head body.

The bottom nozzle is held by an outer flange (33) that serves as a bottom cover to allow simple nozzle design. A top cover (34) guarantees access to the middle and top nozzle. /9

The temperature of the product is maintained inside the nozzle head

at the top and bottom by the concomitant action of covered electrical resistors (35,36) and by the circulation of cooled medium in a cooling circuit (37) that is connected to an inner distribution system in each area close to the product arriving from each channel.

The temperature is maintained in the middle by an annular, sealed electrical resistor (38).

The temperature is regulated using the data from thermal sensors such as (39) in contact with the product close to each area to be regulated by an external circuit.

The number of areas for thermal regulation corresponds to the number of individual processed products, i.e., the number of specific compression chambers.

Fig. 7 illustrates schematically and theoretically the shapes of /10 the composed flat cross sections that are attained using the multichannel extruder according to the invention. These are theoretical shapes, and the sharp and jutting angles are slightly curved in practice.

Although the invention was described in reference to a particular design, it is not thereby limited, and individual simple changes, direct variations, the addition of nonworking parts, and other changes lacking inventive cause specifically fall within the framework of the invention.

FIG. 1

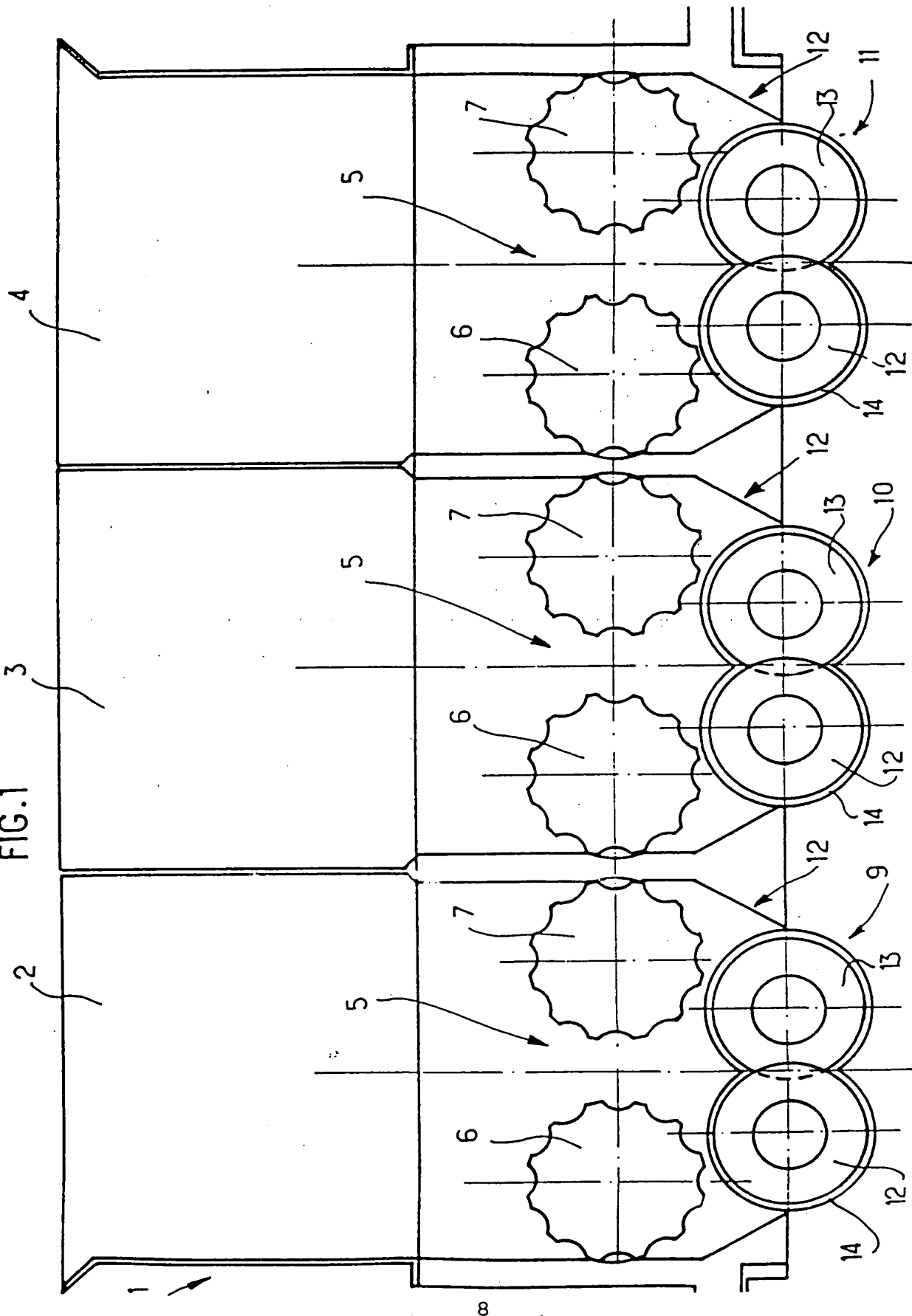


FIG. 2

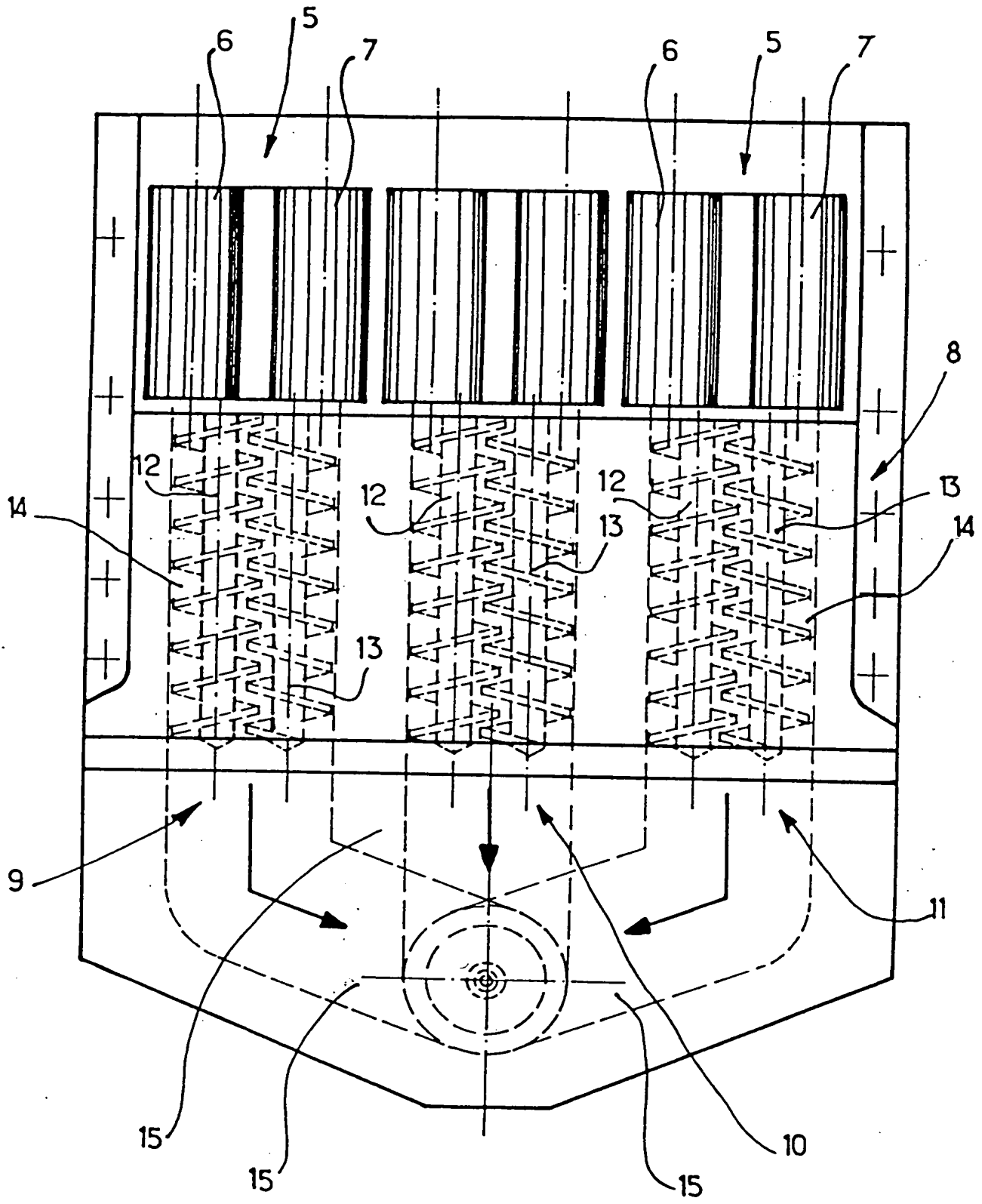
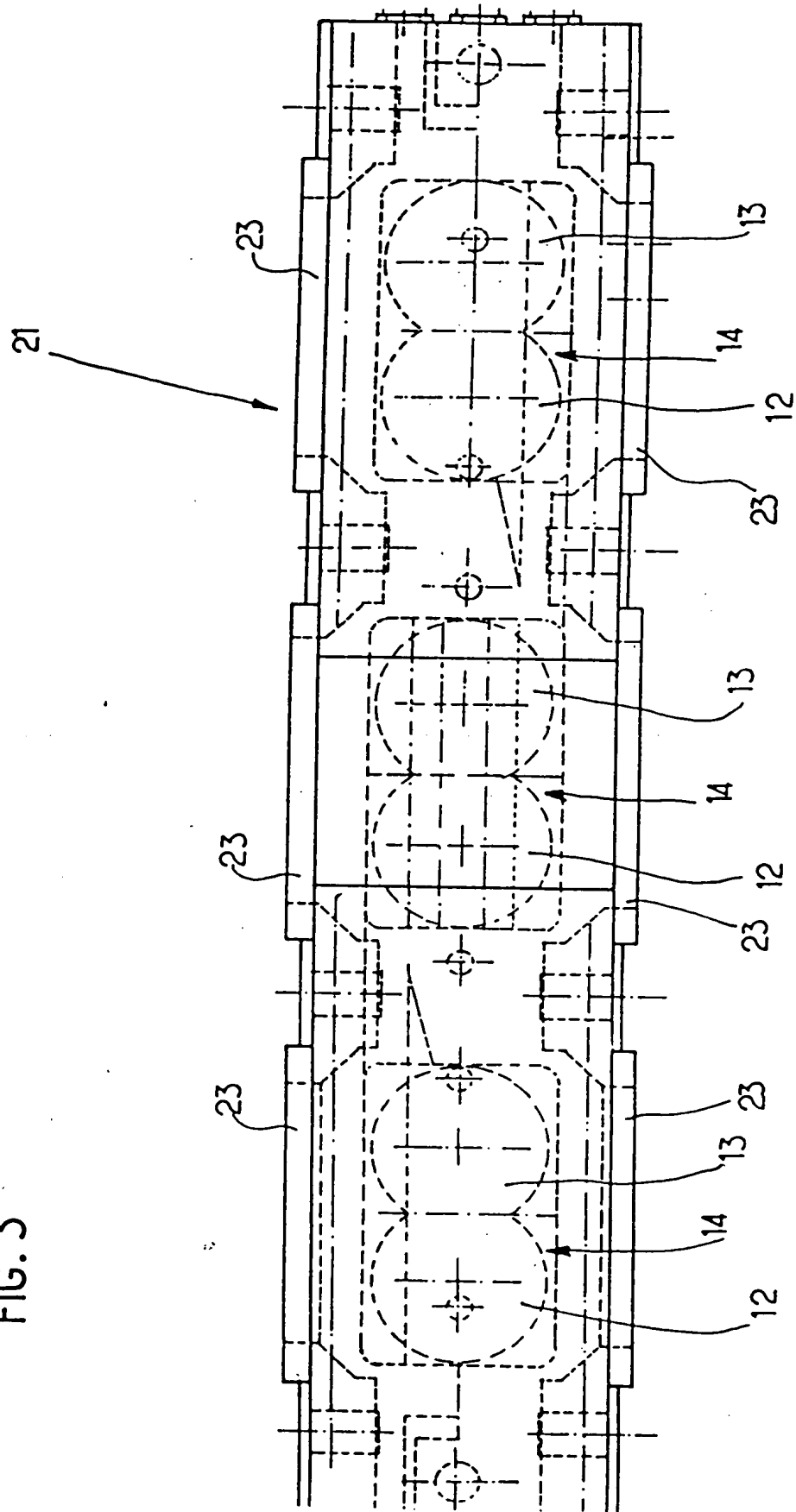


FIG. 3



This technical drawing is a cross-sectional view of a mechanical assembly. The main housing is labeled 15. Inside, there are several components: a central circular part 16, a smaller circular part 17, and a larger circular part 18. A central shaft or rod 19 passes through the assembly. Other components include 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100. The drawing uses various line styles to represent different materials and features, including hatching for solid sections and dashed lines for hidden internal features.

FIG. 5

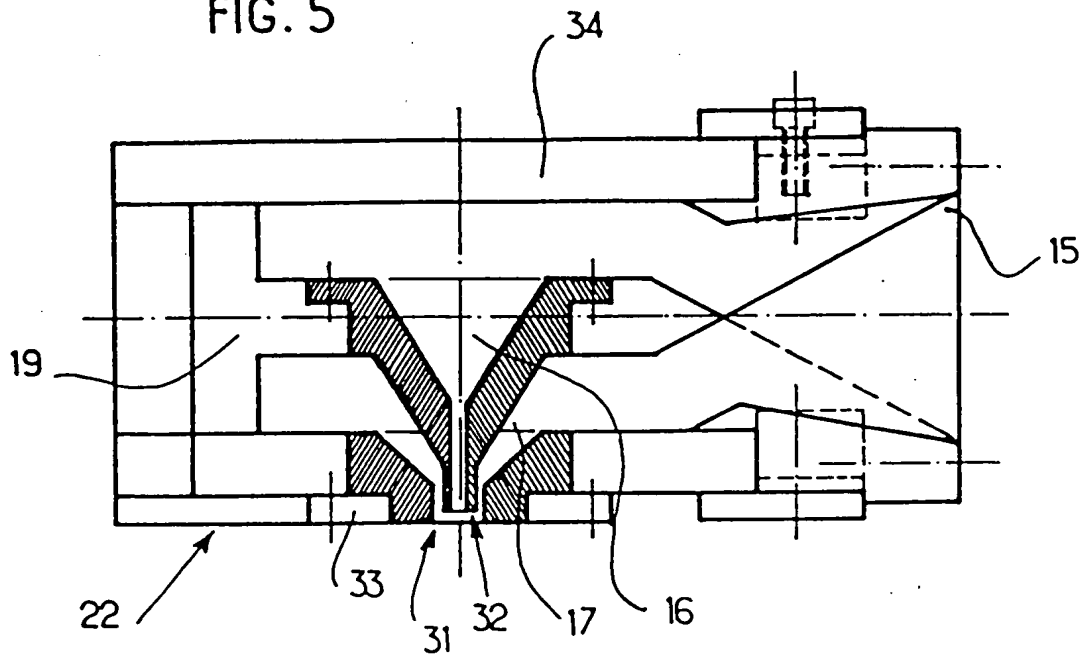


FIG. 6

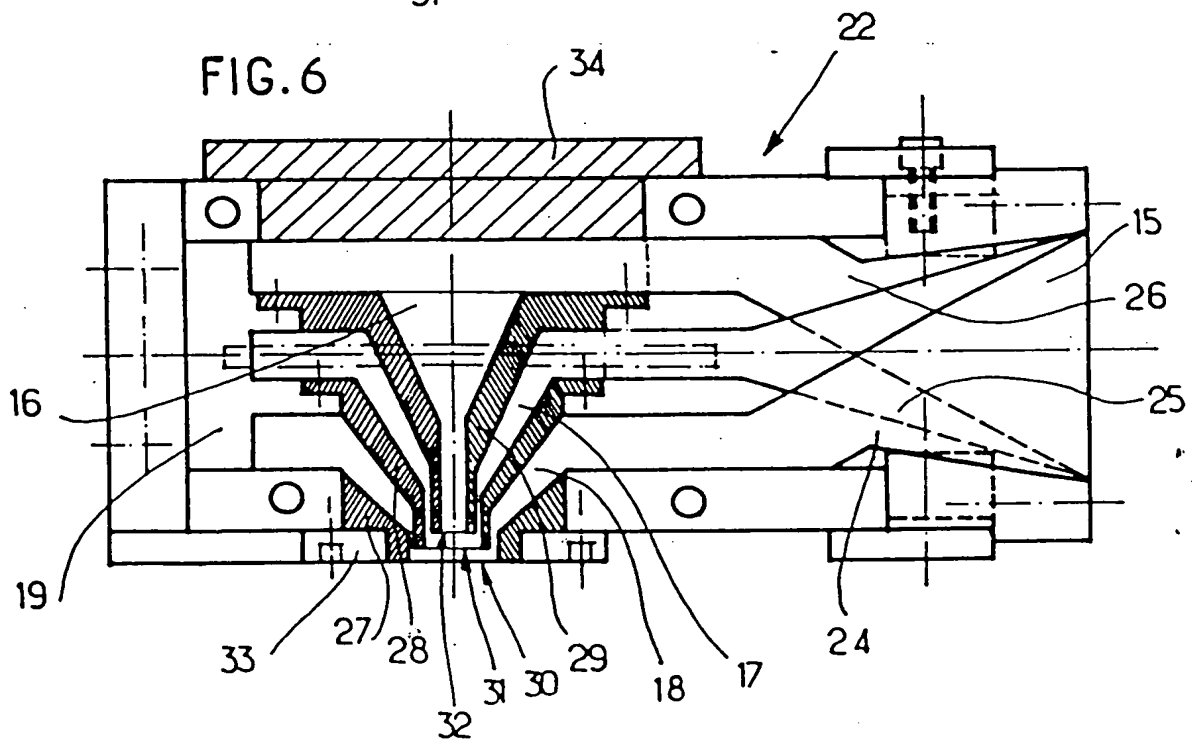
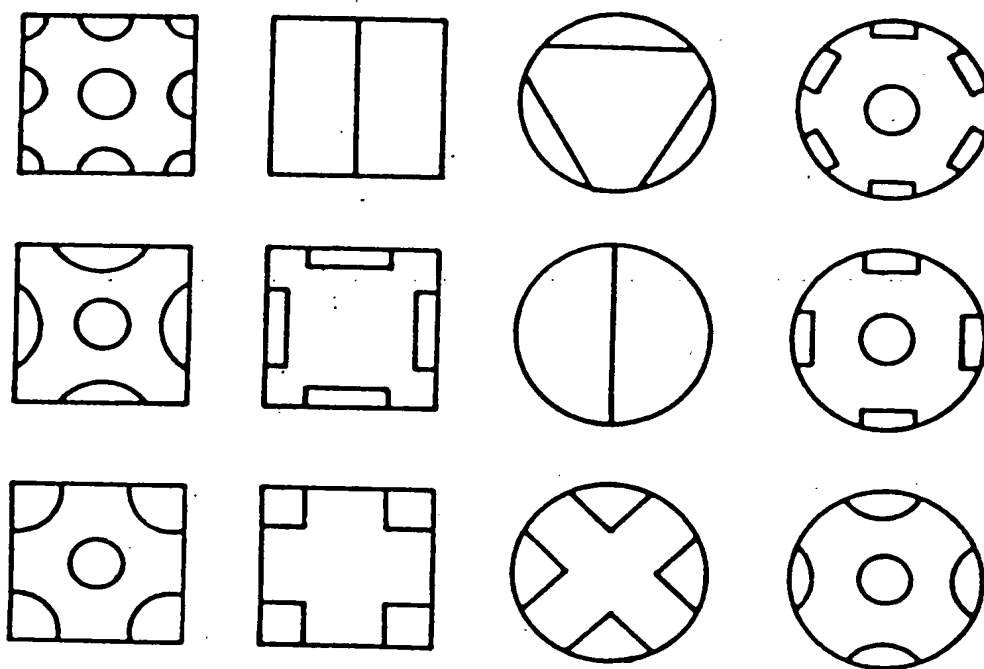


FIG. 7



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85-290710/47 D13 TOGU-10.05.84
 SOC TOGUM SA *DE 3516-852-A
 10.05.84-FR-007388 (14.10.85) A23g-3/30 829c-47/4
 Multichannel chewing gum extruder - with truncated cone inlets
 leading to offset concentric nozzles
 C85-125855

An extruder for multi-coloured and multi-taste pastes, specially chewing gum, consists of a screw press and a compaction channel for each of the supply funnels. Each of these channels ends in a compression block with an inlet to a nozzle.

The nozzles are arranged at right angles to the block and are concentric to each other, with the inner nozzle ends offset inward relative to each other.

ADVANTAGE

This creates a high-capacitive extruder for attractive looking and tasty chewing gum with no limitation to the number of colours or shapes.

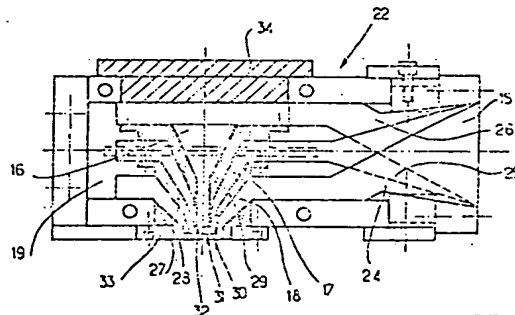
EMBODIMENT

In a three-colour extruder block (22), the paste is supplied by intermediate spaces (15) to compression space (16,17,18). The injection head has connecting passages (24,

D(3-K6)

25,26) of truncated cone shape, leading to three nozzles (27, 28,29).

The nozzles have concentric injection openings (30,31,32) which are slightly offset inward relative to each other, with the central opening most offset. Electrical resistors maintain a constant temperature, controlled by temperature sensors. (17pp39DAHDwgNo6/7).



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DEUTSCHES
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10.05.84 FR 84 07388

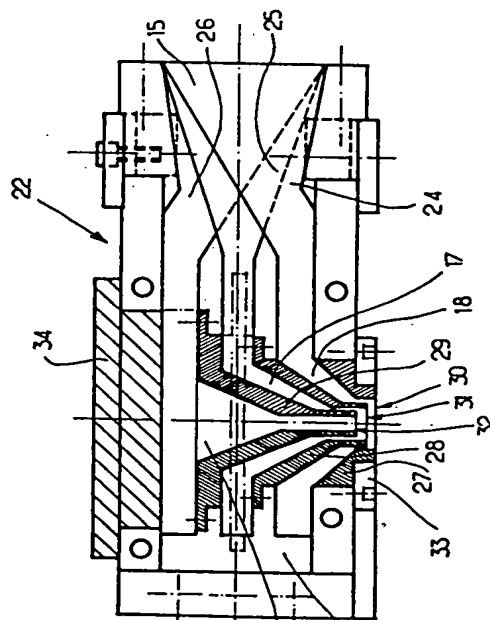
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⑤4 Mehrkanal-Kompaktextruder für pastöse Stoffe, insbesondere für Kaumassen

Mehrkanal-Extruder für pastöse Stoffe, dadurch gekennzeichnet, daß jeder Verdichtungskanal (14) in einen einzelnen Verdichtungsraum (17), (18), (19) mündet, der mit dem Spritzkopfkörper über einen kegelförmigen Raum verbunden ist, wobei dieser Raum von konzentrischen, austauschbaren Düsen (27), (28) und (29) abgegrenzt ist, wobei diese Düsen festgehalten und nach Ausbau der unteren (33) und oberen (34) Deckel zugänglich sind.
Die vorliegende Erfindung betrifft insbesondere die Hersteller von Maschinen für die Verarbeitung von pastösen Stoffen.



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P A T E N T A N S P R Ü C H E

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- 1) Kompakter Extruder mit mehreren Kanälen für pastöse Produkte, bestehend aus einer Zulaufeinheit (1), bestehend aus einer Gruppe von Trichtern mit je einer nachfolgenden Einführeinrichtung (5) und einer Schneckenpresse entlang eines Verdichtungskanals (14), dadurch gekennzeichnet, daß jeder Kanal (14) in einen einzelnen Raum (16), (17), (18) in einen Verdichtungsblock mündet, wobei jeder Raum für einen Einlauf parallel zu der Verdichtungsrichtung und einen senkrechten Auslauf durch angepaßte Düsen (27), (28) und (29) ausgebildet ist, die senkrecht einander folgen, mit gegeneinander abgesetzten Auswerfleitungen.
- 2) Extruder nach dem Anspruch gemäß 1 dadurch gekennzeichnet, daß die Auswerfleitung (32) von der mittleren Düse am meisten abgesetzt ist.
- 3) Extruder nach dem Anspruch 1 dadurch gekennzeichnet, daß die Aufrechterhaltung der Temperatur vom Produkt innerhalb von dem Spritzkopf unten und oben in jedem Bereich in der Nähe von dem Produkt durch das Zusammenwirken einerseits von geschlossenen elektrischen Widerständen (35) und (36) und andererseits von dem Umlauf von einem gekühlten Medium entlang eines Kühlquertels (37), der an eine innere Verteilung angeschlossen ist, sichergestellt ist.

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- 2 -

- 4) Extruder nach den Ansprüchen 1 und 3 dadurch gekennzeichnet, daß die Aufrechterhaltung der Temperatur in der Mitte durch einen ringförmigen geschlossenen elektrischen Widerstand (38) erfolgt.
- 5) Extruder nach den Ansprüchen 1 und 3 dadurch gekennzeichnet, daß die Temperaturregelung von einem äußeren Kreislauf anhand der Angaben von thermischen Fühlern wie (39) in Berührung mit dem Produkt in der Nähe von jedem zu regulierenden Bereich erfolgt.

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08.05.1985 -

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Mehrkanal-Kompaktextruder für pastöse Stoffe, insbesondere
für Kaumassen

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Die vorliegende Erfindung betrifft einen kompakten Extruder mit mehreren Kanälen für pastöse Stoffe, insbesondere für Kaumassen und andere bei der Verarbeitung im warmen Zustand halbflüssige Stoffe.

Aus Gründen der Aufmachung jedoch auch des Gefallens bei dem Verzehr fordern die Hersteller und die Verbraucher Produkte mit mehreren Geschmacksrichtungen, d.h. mit mehreren Farben. Diese mehrschichtigen Produkte bieten wesentliche Vorteile außer dem Vorteil hinsichtlich der Mischung oder der Folge der Geschmäcker.

Somit kann das Produkt wegen der unmittelbar auf seiner Seitenfläche sichtbaren Farbenfolgen durch ein Glasgefäß oder eine durchsichtige Verpackung verlockender erscheinen. Ferner können Farbenfolgen an der Oberfläche den Eindruck von anderen geometrischen Formen erwecken, die mit den zur Zeit vorhandenen Einrichtungen schwierig, sogar unmöglich, zu bewerkstelligen sind.

Nach den Produkten und der Art der späteren Verarbeitung wird es möglich, auf den Überzug zu verzichten.

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Schließlich hat diese Art von Produkt, das zur Zeit sehr verlangt wird, die Hersteller von Fertigungsmaschinen dazu gebracht, leistungsfähigere, leichter zu bedienende und zu wartende Maschinen zu konstruieren.

Es gibt selbstverständlich Spritzköpfe, die zweifarbige Stränge mittels zwei gekoppelten Extrudern mit nachfolgendem Verbindungsstück fertigen. Diese Art von Vorrichtung beruht auf einer schweren, sperrigen, wenig praktischen und dazu noch teuren Technologie.

Der Erfindung liegt die Aufgabe zugrunde, einen wesentlich praktischen und leistungsfähigen Extruder für die Fertigung von mehrfarbigen zusammengesetzten Produkten ohne theoretische Begrenzung der Anzahl von Farben und von Formen anzubieten.

Zu diesem Zweck besteht der Extruder gemäß der Erfindung aus einer Einheit für den Zulauf und die Vorbereitung des Produkts, einer Verdichtungseinheit, einem Verdichtungsraum und einem mehrfachen Spritzkopf mit auswechselbaren Düsen.

Die Auslegung von dem Spritzkopf ermöglicht auf einfache Weise den Austausch der Extruderdüsen für eine Instandsetzung oder nur für die Änderung der Formen.

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Die Arbeiten für die Reinigung und die Wartung sind wegen des einfachen Ausbaus leicht auszuführen.

Ferner sichert die thermische Regelung mit Kreisläufen für Heizung und Kühlung die optimalen Bedingungen für die Verarbeitung von dem Produkt.

Indem der Platzbedarf klein ist, kann der Spritzkopf in den Fertigungssträngen von kleineren Abmessungen verwendet werden.

Andererseits verhindert der Auslauf von dem Produkt rechtwinklig gegenüber dem Einlauf und senkrecht gegenüber dem Boden jede anfängliche Verformungsbeanspruchung beim Entstehen von dem Strang, das unter den besten Bedingungen vor sich geht.

Die ausführlichen technischen Merkmale der Erfindung und die weiteren Vorteile sind in der nachfolgenden Beschreibung festgehalten, die als nicht einschränkendes Beispiel unter Bezug auf die beiliegende Zeichnung ausgearbeitet wurde, wobei:

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- die Abb. 1 ist ein Querschnitt von der Zulaufeinheit
- die Abb. 2 ist eine Draufsicht von der Zulaufeinheit und von der Verdichtungseinheit
- die Abb. 3 ist eine stirnseitige Ansicht von dem Ausgang von den Verdichtungseinheiten
- die Abb. 4 ist eine Teil-Draufsicht und ein Teil-Längsschnitt von dem Verdichtungsraum
- die Abb. 5 und 6 sind Querschnitte von dem Spritzkopf mit zwei bzw. drei Kanälen
- die Abb. 7 ist eine schematische Darstellung von Beispielen der Formen von möglichen theoretischen geraden Querschnitten mit dem Mehrkanal-Extruder gemäß der Erfindung.

Nachstehend wird der Mehrkanal-Extruder gemäß der Erfindung für einen Dreifarben-Spritzkopf beschrieben. Die angewandte Technik ist für eine höhere Anzahl geeignet. Die einzige vorgenommene Einschränkung hat einen praktischen Charakter.

Der Extruder wird in einen Strang für die Formung von Kaumasse oder einem anderen pastösen Produkt eingebaut. Das Produkt läuft warm, von Hand oder automatisch, in eine Zulaufeinheit 1 ein, die aus einer Gruppe von drei einzelnen Trichtern 2, 3, 4 besteht.

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Im unteren Teil enthält jeder Trichter eine Einführeinrichtung 5 aus zwei geriffelten Walzen 6, 7, die das Produkt nach unten in die Verdichtungseinheit 8 pressen. Die Verdichtungseinheit besteht aus drei Schneckenpressen 9, 10 und 11 an der pyramidalen Basis von jedem Trichter.

Diese Anordnung ist klarer ersichtlich aus der Abb. 2, auf der die Riffelwalzen von jeder Einführeinrichtung festzustellen sind. Die Schneckenpressen bestehen je aus zwei nebeneinander angeordneten Verdichtungsschnecken 12 und 13, deren Gänge in mittlerer Stellung ineinandergreifen. Die Schnecken nehmen den gesamten Querschnitt von jedem Verdichtungskanal 14 ein, der in einen Zulaufzwischenraum 15 mündet und mit einem einzelnen Verdichtungsraum 16, 17, 18 von dem eigentlichen Verdichtungsraum 19 in Verbindung steht, wobei jeder einzelne Verdichtungsraum für einen zur Verdichtungsrichtung parallelen Einlauf und einen senkrechten Auslauf ausgebildet ist.

Hierzu sind nachstehend insbesondere die Abb. 4, 5 und 6 heranzuziehen, die die besondere Ausbildung von dem Verdichtungsraum 19 und von dem Spritzkopf 20 darstellen.

Die Verdichtungskanäle enden an einem vorderen Block 21, der mit dem Block 22 von dem Verdichtungsraum fest verbunden ist. Dieser vordere Block 21 enthält mehrere obere und untere Deckel wie 23 über den Kanälen 14.

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Wie die Abb. 5 und 6 besonders zeigen, ist jeder Kanal 14 mit einem eigenen Verdichtungsraum 16, 17 oder 18 verbunden. Die Einläufe in diese Räume erfolgen parallel und in der gleichen Ebene über den vorderen Block 21.

Die Kanäle werden in dem Block von dem Verdichtungsraum 19 durch kegelstumpfbartige Verbindungen 24, 25 und 26 zu ihrem einzelnen Verdichtungsraum 16, 17 und 18 fortgesetzt, die senkrecht einander folgen.

Jeder einzelne Verdichtungsraum wird aus einem oberen Ringvolumen und einem kegelstumpfbartigen Hauptteil gebildet, wobei der Hauptteil durch den Block von dem Spritzkopf und/oder die angrenzenden Räume begrenzt ist. Die Räume sind durch die schraffierten Wandungen der Düsen 27, 28 und 29 gekennzeichnet. Diese Düsen sind untereinander versetzt und besitzen konzentrische Auswerfleitungen 30, 31 und 32, die gegeneinander leicht abgesetzt sind, wobei die mittlere Auswerfleitung am meisten abgesetzt ist, um am Auslauf eine gute Verbindung der rohrförmigen oder profilartigen einzelnen Schichten sicherzustellen und somit ein homogenes Produkt zu bilden.

Die im allgemeinen trichterförmigen eigentlichen Düsen sind oben und in der Mitte an der Innenseite von dem Spritzkopfkörper verflanscht.

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Die untere Düse ist von einem Außenflansch 33 festgehalten, der als unterer Deckel für den leichten Ausbau der Düse dient. Ein oberer Deckel 34 gewährt den Zugang zu der mittleren und oberen Düse.

Die Aufrechterhaltung der Temperatur von dem Produkt innerhalb von dem Spritzkopf erfolgt unten und oben durch das Zusammenwirken einerseits von gepanzerten elektrischen Widerständen 35 und 36 und andererseits von dem Umlauf von einem gekühlten Medium entlang eines Kühlgürtels 37, der in jedem Bereich in der Nähe von dem über jeden Kanal herangeführten Produkt an eine innere Verteilung angeschlossen ist.

Die Aufrechterhaltung der Temperatur erfolgt in der Mitte durch einen ringförmigen geschlossenen (blindée) elektrischen Widerstand 38.

Die Temperaturregelung wird anhand der Angaben von thermischen Fühlern wie 39 in Berührung mit dem Produkt in der Nähe von jedem zu regulierenden Bereich von einem äußeren Kreislauf sichergestellt.

Die Anzahl der Bereiche für thermische Regelung entspricht der Anzahl der einzelnen verarbeiteten Produkte, d.h. der Anzahl der spezifischen Verdichtungsräume.

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Die Abb. 7 veranschaulicht schematisch und theoretisch die Formen der zusammengesetzten geraden Querschnitte, die mit dem Mehrkanal-Extruder gemäß der Erfindung erzielt werden. Es handelt sich hierbei um theoretische Formen und die dargestellten scharfen und vorspringenden Winkel weisen in der Praxis eine leichte Krümmung auf.

Obwohl die Erfindung bezüglich einer besonderen Ausführung beschrieben wurde, wird sie hierdurch nicht begrenzt und einzelne einfache Änderungen, unmittelbare Varianten, das Hinzufügen von unwirkenden Teilen und andere Änderungen ohne erfinderische Ursache fallen eindeutig in den Rahmen der Erfindung.

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INFORMATION

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FIG. 2

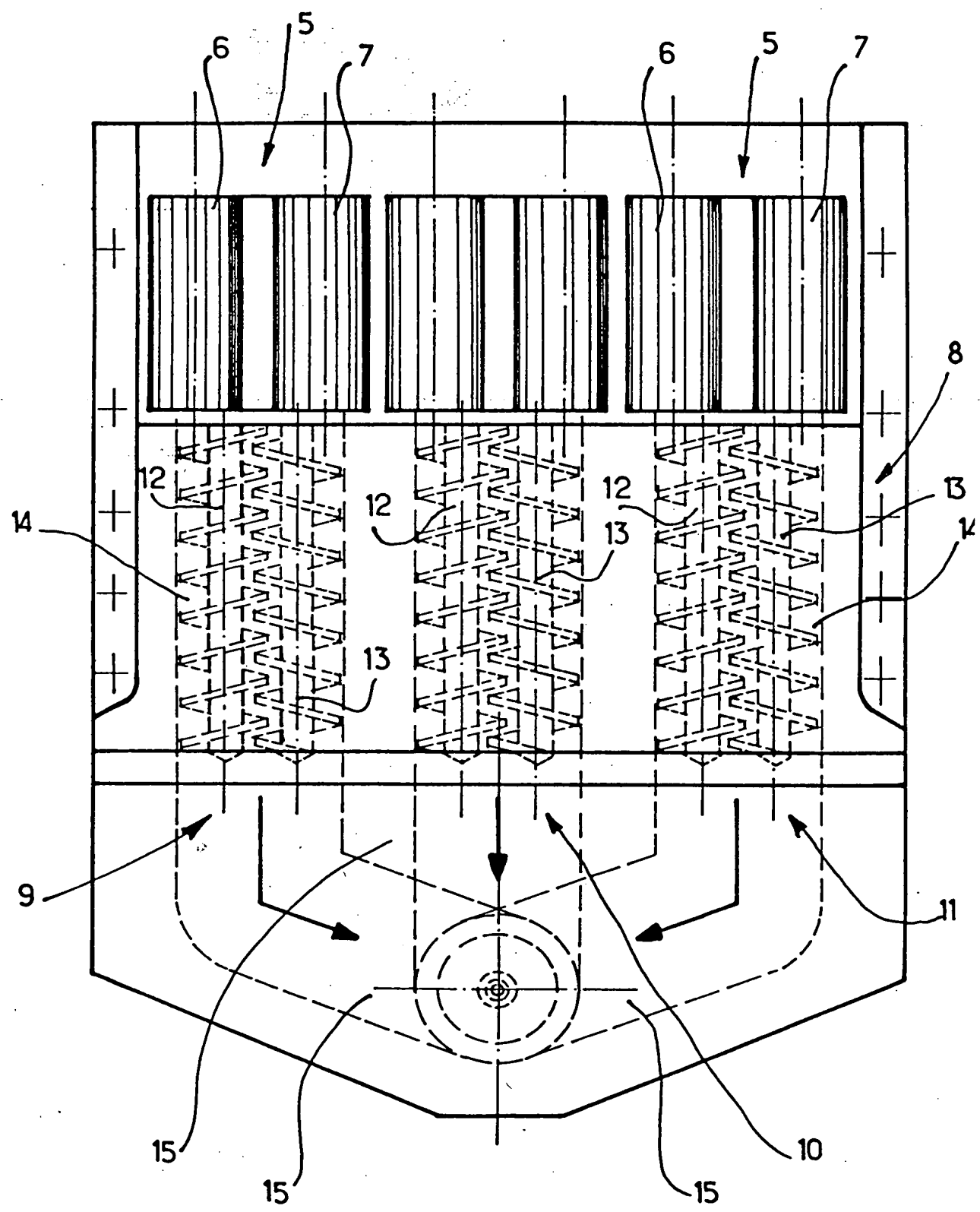


FIG. 3

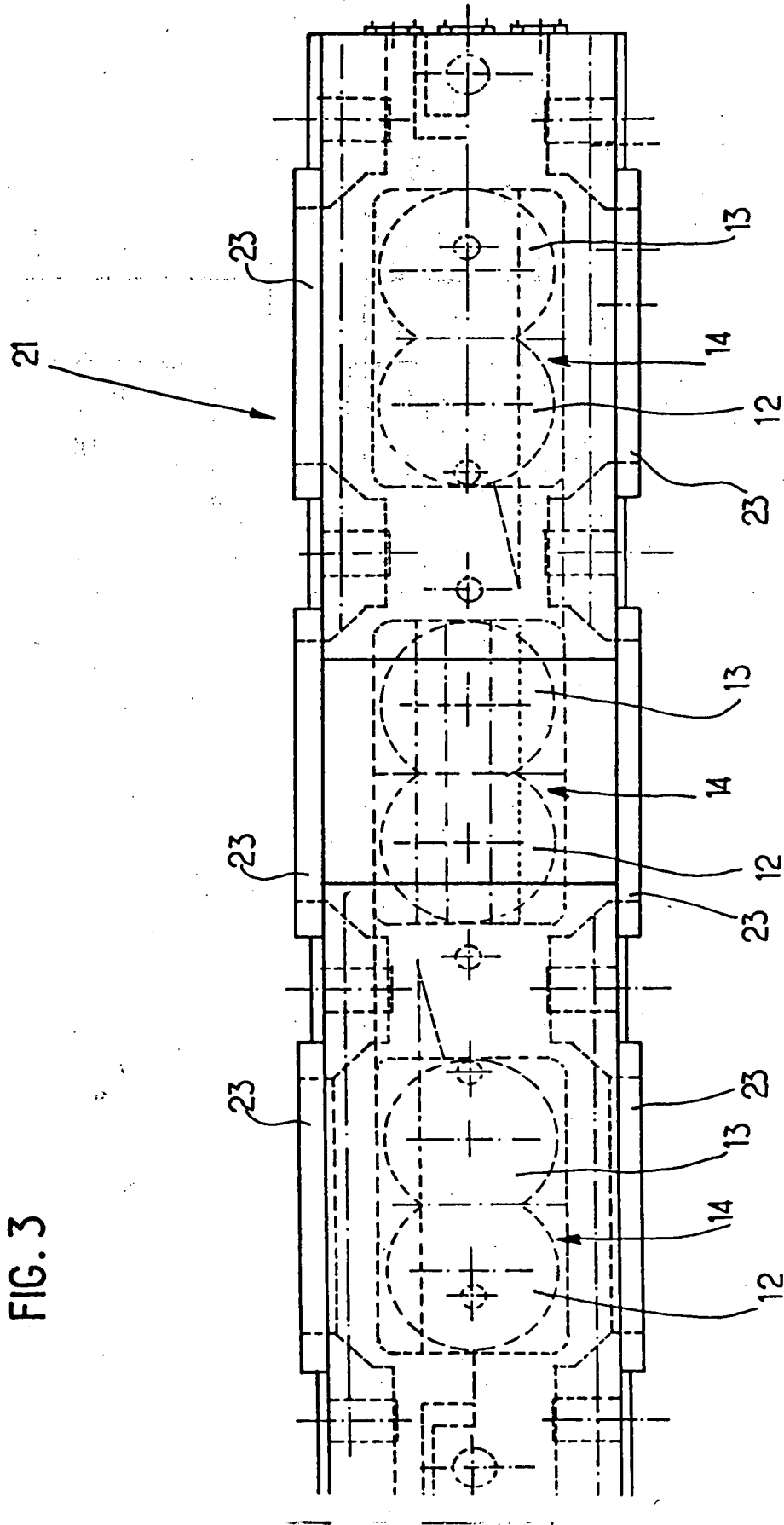


FIG. 4

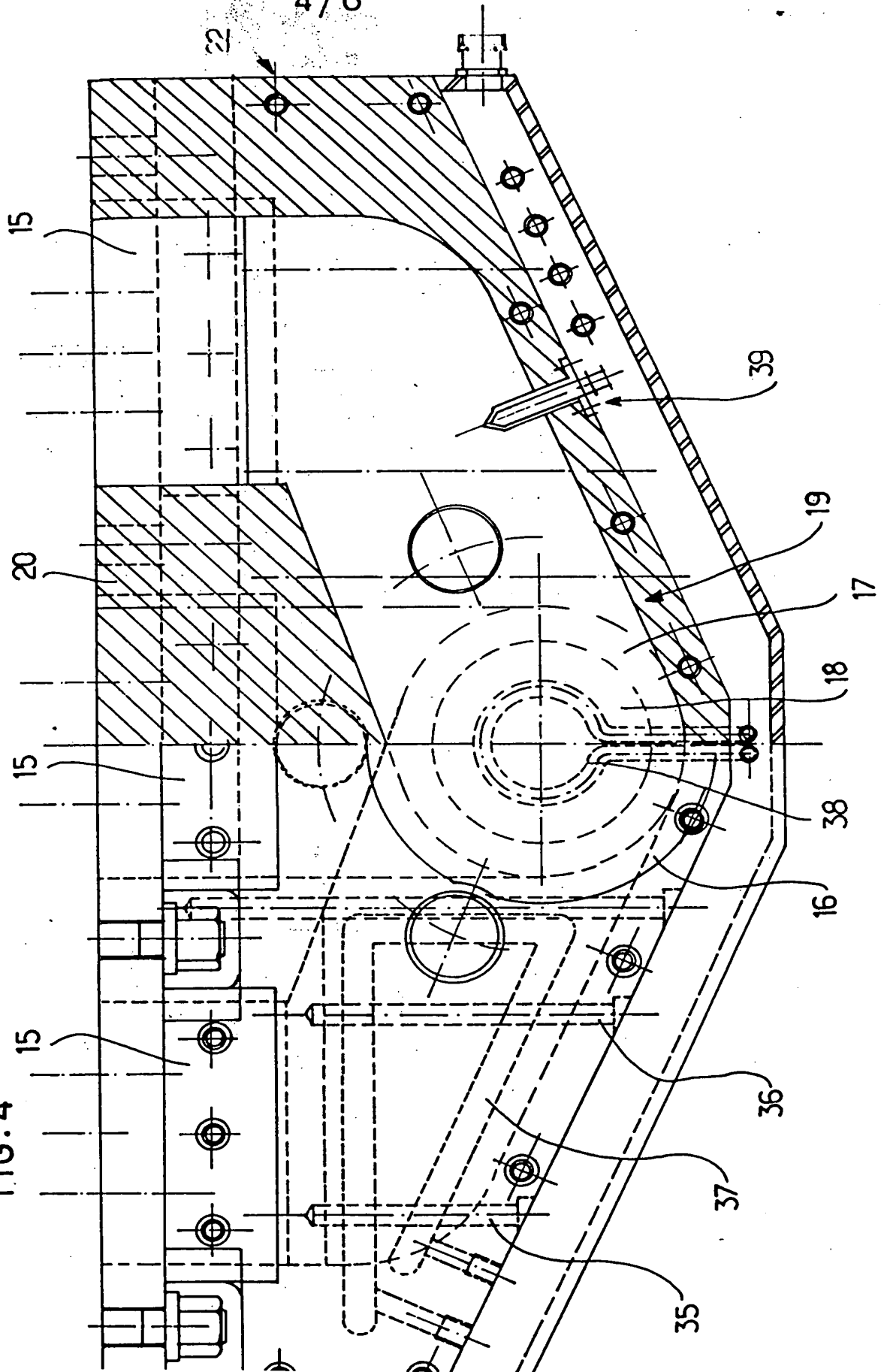


FIG. 5

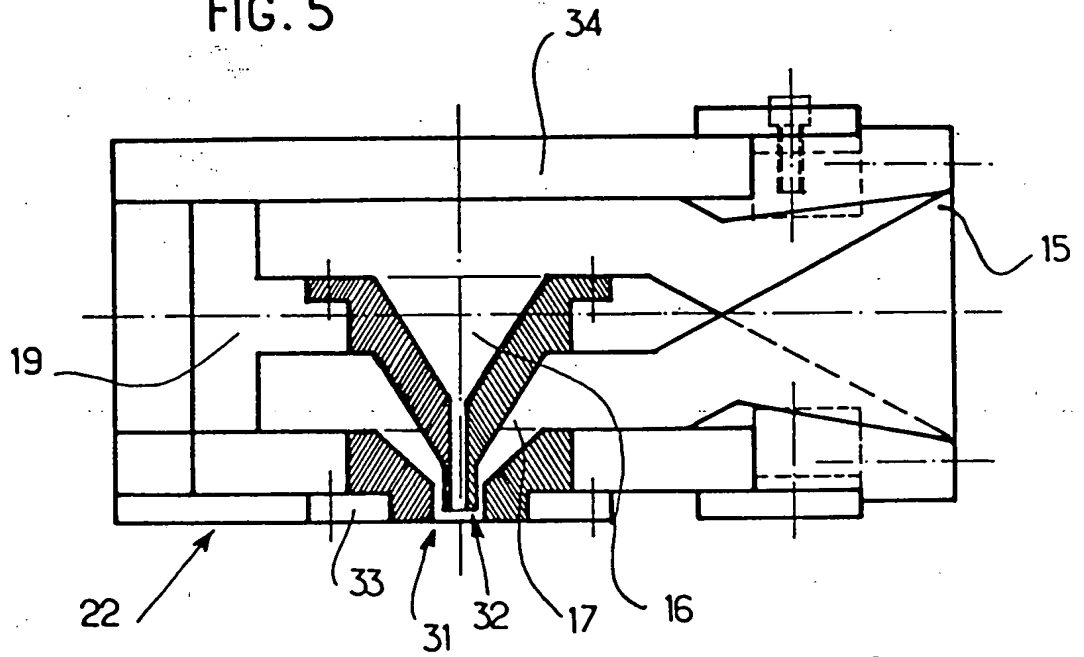


FIG. 6

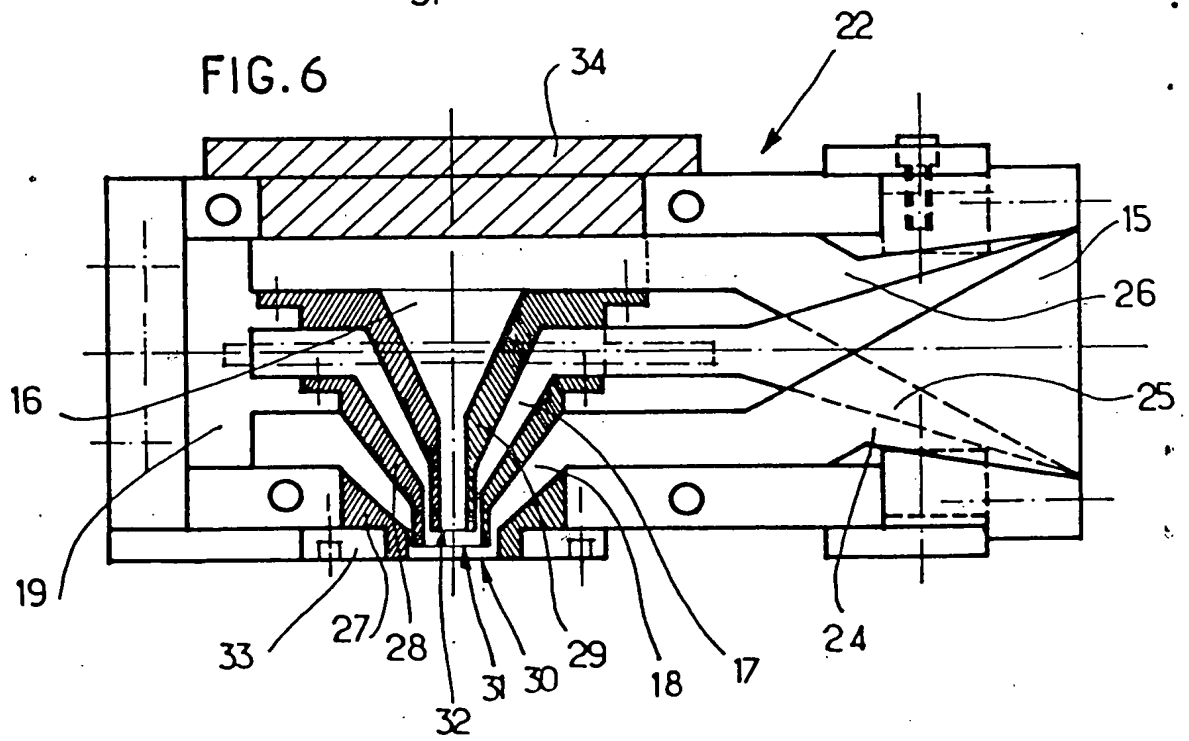
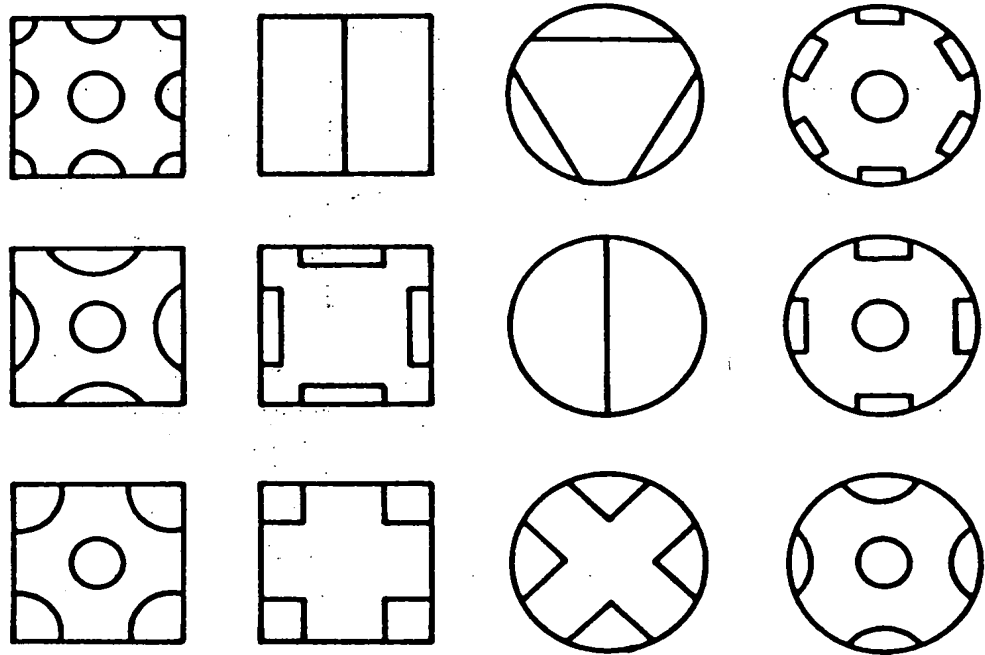


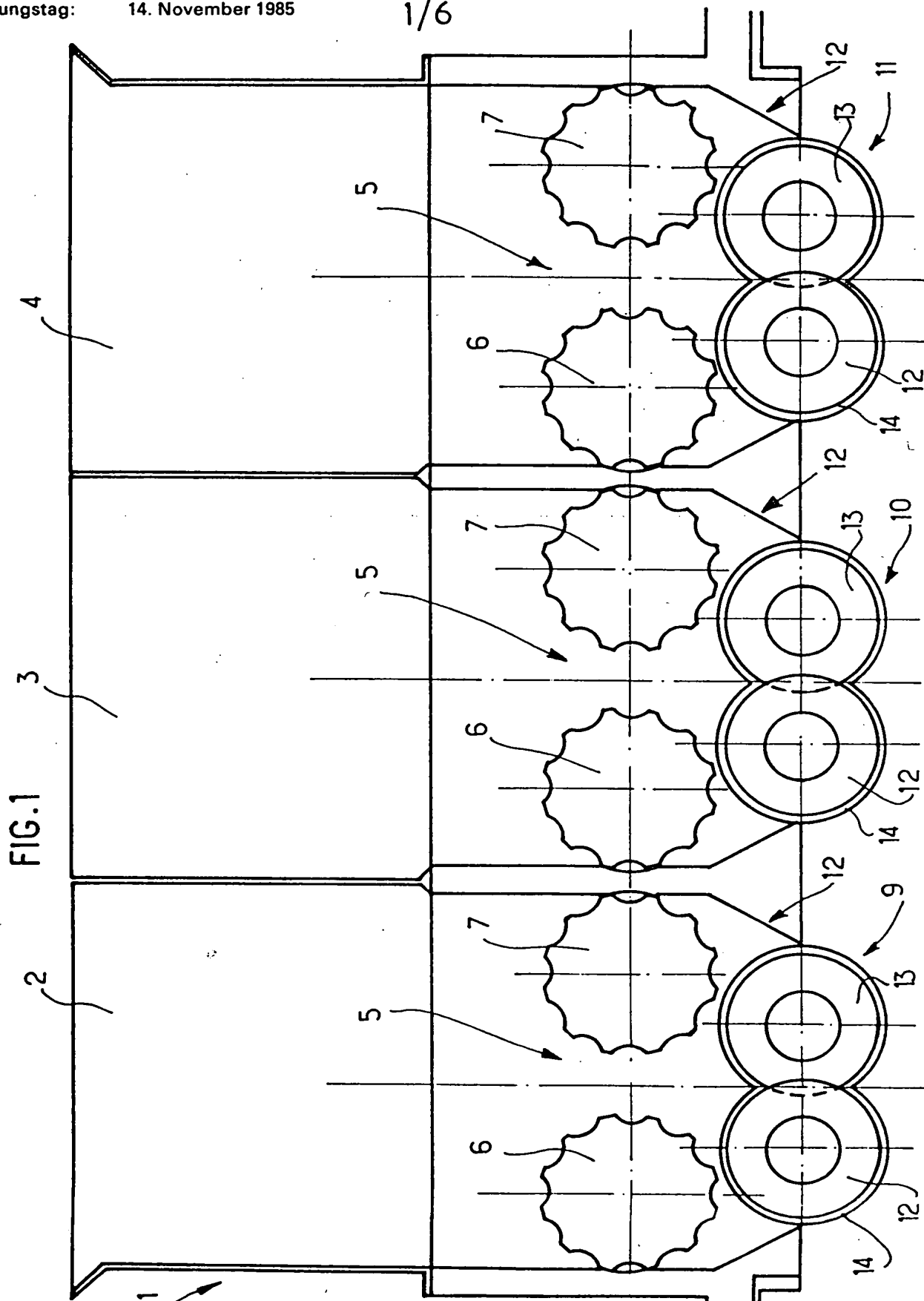
FIG. 7

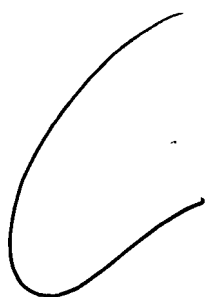


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United States Patent [19]**Cherukuri et al.**[11] **Patent Number:** 4,971,806[45] **Date of Patent:** Nov. 20, 1990[54] **MULTI-LAYERED CHEWING GUM
COMPOSITION HAVING DIFFERENT
RATES OF FLAVOR RELEASE**[75] **Inventors:** Subraman R. Cherukuri, Towaco,
N.J.; Frank T. Hrisisce, Long Island
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both of N.Y.[73] **Assignee:** Warner-Lambert Company, Morris
Plains, N.J.[21] **Appl. No.:** 449,084[22] **Filed:** Dec. 8, 1989**Related U.S. Application Data**

[63] Continuation of Ser. No. 109,963, Oct. 19, 1987, abandoned, which is a continuation-in-part of Ser. No. 816,949, Jan. 6, 1986, abandoned, which is a continuation of Ser. No. 575,609, Jan. 31, 1984, abandoned.

[51] **Int. Cl.³** A23G 3/30[52] **U.S. Cl.** 426/5; 426/103[58] **Field of Search** 426/5, 3, 103[56] **References Cited****U.S. PATENT DOCUMENTS**1,193,423 8/1916 Pryor 426/5
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4,399,154	8/1983	Puglia	426/5
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Primary Examiner—Jeanette Hunter**Attorney, Agent, or Firm**—Daniel A. Scola, Jr.; Craig M. Bell[57] **ABSTRACT**

A multi-layered chewing gum composition is disclosed. The composition has a moisture content of less than about 1% by weight of the composition and contains at least two layers each comprising a chewing gum composition. The chewing gum compositions of each layer comprise gum base in an amount of about 15 to about 60% by weight of the layer such that the difference in gum base content between the layers is about 3 to about 15% by weight. The chewing gum compositions of each layer also comprise sweeteners, flavors, and optionally, at least one other conventional chewing gum additive.

13 Claims, No Drawings

MULTI-LAYERED CHEWING GUM COMPOSITION HAVING DIFFERENT RATES OF FLAVOR RELEASE

REFERENCE TO RELATED APPLICATIONS

This application is a continuation of application Ser. No. 109,963 filed Oct. 19, 1987 now abandoned in turn, is a continuation-in-part of application Ser. No. 816,949 filed on Jan. 6, 1986, now abandoned which in turn is a continuation application of application Ser. No. 575,609 filed on Jan. 31, 1984 now abandoned.

FIELD OF THE INVENTION

This invention relates to a chewing gum of the two layer laminate type of which one layer has a high initial flavor release and the other layer has a longer lasting flavor release.

BACKGROUND

Chewing gum research has concentrated on the development of products that have a good taste and chew. This has been accomplished by adjusting gum base, flavor, sweetener content and flavor release characteristic. However, there has been difficulty in achieving easy bite, flavor impact, quick flavor release and sustained flavor in a single chewing gum composition.

U.S. Pat. No. 4,352,824 discloses a chewing gum composition having long lasting flavor. The desired result is accomplished by incorporating into the chewing gum a non-aqueous solid fatty or gelatinous material, e.g. butter. In order to provide initial flavor, a separate pre-sweetened or pre-flavored slab of conventional chewing gum is combined with the slab of gum containing the fatty or gelatinous material.

U.S. Pat. No. 4,352,823 discloses a coextruded gum having a soft core portion comprising a polyisobutylene elastomer and in excess of 1% and usually about 5% up to about 10% moisture surrounded by a harder shell of conventional gum composition. This patent relies on the combination of plasticizers (glyceryl triacetate and acetylated monoglyceride) to provide softness to the gum base.

Similarly, U.S. Pat. No. 4,352,825 discloses a coextruded gum having a soft center of high water content and containing a combination of at least two recrystallized sweeteners. No specific characteristic other than the physical characteristics of easy bite and easy chew are attributed to the soft gums of the prior art. The purpose is to provide a way for handling soft gum compositions in conventional wrapping machines. The soft gum composition is said to have an easy bite and chew.

The chewing gum compositions disclosed above are hydrous compositions—i.e., they have conventional or above conventional moisture levels. These levels of moisture can affect the stability of the composition through loss of the moisture resulting in staling. Those compositions having relatively high moisture levels usually are sticky and require special handling. Also, in attempts to reduce the likelihood of staling of hydrous gum compositions, non-transparent packaging has been utilized. The consumer is therefore unable to see how the product appears until the product is removed from the packaging. A welcome contribution to the art would be a gum composition having a sequential release of flavor (flavoring agents) which avoids the problems associated with the above described hydrous gum compositions. Another welcome contribution to the art

would be a non-staling gum composition—i.e., an anhydrous composition—which can be packaged in transparent packaging materials so that the consumer has a visually enhanced appreciation of the product. Such a contribution is provided by this invention.

SUMMARY OF THE INVENTION

It has surprisingly been found that flavor impact and easy bite can be achieved in anhydrous chewing gum compositions through a non-homogeneous combination of chewing gum compositions wherein at least two combined compositions have differing base contents. An example of such a chewing gum composition is a multi-layer chewing gum composition wherein at least two layers comprise chewing gum compositions which differ in their gum base content. The flavor impact achieved is a quick release of flavor (flavoring agent) as well as a sustained flavor release. The quick release of flavor is obtained from the chewing gum composition having the lower gum base content whereas the sustained flavor release is obtained from the chewing gum composition having the higher gum base content. The flavoring agents used are generally liquids but optionally sprayed dried flavoring agents may be used. The degree of softness of the multi-layered chewing gum composition can also be controlled through the use of chewing gum compositions having differing gum base contents rather than having to rely on additional additives such as plasticizers and softeners.

The gum layers are laminated together by conventional methods, e.g., coextrusion, roller pressing, etc.

More specifically, this invention provides a multi-layered chewing gum composition, having a moisture content of less than about 1% by weight of said composition, comprising at least two layers wherein

(A) a first layer comprises a chewing gum composition which comprises gum base in an amount of about 15 to about 60% by weight of the first layer composition, an effective amount of a flavoring agent, an effective amount of a sweetener, and optionally, effective amounts of at least one additional conventional chewing gum additive, such that the total of all ingredients in said first layer composition equals 100% of said first layer; and

(B) a second layer comprises a chewing gum composition which comprises gum base in an amount of about 15 to about 60% by weight of the second layer composition, an effective amount of a flavoring agent, an effective amount of a sweetener, and optionally, effective amounts of at least one additional conventional chewing gum additive, such that the total of all ingredients in said second layer equals 100% by weight of said second layer; and

wherein there is a difference in gum base content of about 3 to about 15% by weight between said first and second layers, and wherein the layers release the flavoring agents at different rates.

Since the anhydrous compositions of this invention are resistant to staling—i.e., non-staling—transparent type packaging materials may be used for the ultimate product. This is an added benefit because the consumer's appreciation for the ultimate product is visually enhanced. For example, the consumer is able to observe multicolor designs and color variations in the compositions of this invention.

DETAILED DESCRIPTION OF THE INVENTION

The compositions of this invention are anhydrous, that is, they have a total moisture content of less than 1% by weight of the composition, with not more than about 0.9% by weight being preferred and not more than about 0.3% by weight being most preferred. This is accomplished by utilizing chewing gum compositions that have the above mentioned moisture levels. Chewing gum compositions having these moisture levels are known in the art, see for example, U.S. Pat. No. 4,579,738 issued to Cherukuri et al on Apr. 1, 1986; U.S. Pat. No. 4,581,234 issued to Cherukuri et al on Apr. 8, 1986; and U.S. Pat. No. 4,587,125 issued to Cherukuri et al on May 6, 1986; the disclosures of each being incorporated herein by reference thereto.

The compositions of this invention comprise at least two different chewing gum compositions non-homogeneously combined that differ in gum base content, and may contain the same or different flavoring agents and the same or different sweeteners. In particular, the compositions of this invention are multi-layer and comprise at least two layers, a first layer and a second layer, which comprise chewing gum compositions of differing gum base content. More particularly, the compositions of this invention are two layered comprising a first layer chewing gum composition and a second layer chewing gum composition wherein the first layer composition and the second layer composition have differing base contents. The disclosure relating to the chewing gum compositions which comprise the compositions of this invention are applicable to two layered, multi-layered, and other non-homogeneous combinations of the chewing gum compositions.

The chewing gum compositions which comprise the compositions of this invention have a gum base content of about 15 to about 60% by weight of the composition containing such gum base. Preferably a first layer comprises a chewing gum composition having a gum base content of about 25 to about 35% by weight with about 27 to about 31% by weight being most preferred. Preferably a second layer comprises a chewing gum composition having a gum base content of about 28 to about 50% by weight with about 30 to about 40% by weight being preferred. The amount of gum base for the layers is suitably selected so that the difference in gum base content between the layers is about 3 to about 15% by weight with about 3 to about 10% by weight being preferred. Thus, for example, if the first layer composition contains gum base in an amount of about 25% by weight of said first layer, the second layer composition will contain gum base in an amount of about 28 to about 40% by weight of said second layer. The gum base used in the compositions of the different layers may be the same or different but is preferably the same.

The other components or ingredients of the compositions of the different layers, such as sweeteners and flavoring agents, may be the same or different and the amounts may be the same or different. As stated above the layer having the lower gum base content will exhibit a quick initial release of flavor and flavor impact and the layer having the higher base content will have a sustained release of flavor. Those layers with less gum base and rapid flavor release would be expected to have soft chew properties and those layers with a high gum base content and longer flavor release properties would be expected to have a harder chew.

The compositions of this invention result in a chewing gum laminate composite which has a differential release rate of flavor in each of the two layers. This differential release rate aspect of the invention may be utilized in the controlled release of other chewing gum adjunctives such as medicaments.

The gum base used in this invention may be any water-insoluble gum base well known in the art, and include those gum bases utilized for chewing gums and bubble gums. Illustrative examples of suitable polymers in gum bases include both natural and synthetic elastomers and rubbers. For example, those polymers which are suitable in gum bases include, without limitation, substances of vegetable origin such as chicle, crown gum, nispero, rosadinha, jelutong, perillo, niger gutta, tunu, balata, gutta-percha, lechi-capsi, sorva, gutta kay, mixtures thereof, and the like. Synthetic elastomers such as butadiene-styrene copolymers, polyisobutylenes, isobutylene-isoprene copolymers, polyethylenes, polyvinylacetates, mixtures thereof, and the like are suitable.

The gum base may include a non-toxic vinyl polymer, such as polyvinyl acetate and its partial hydrolysate, polyvinyl alcohol, and mixtures thereof. When utilized, the vinyl polymer may possess a molecular weight ranging from about 3,000 up to and including 94,000.

The gum base may contain conventional elastomer solvents. These solvents may comprise terpene resins, such as polymers of α -pinene or β -pinene; methyl, glycerol or pentaerythritol esters of rosins or modified rosins, such as hydrogenated, dimerized or polymerized rosins or mixtures thereof. Examples of elastomer solvents suitable for use herein include pentaerythritol ester of partially hydrogenated wood or gum rosin, pentaerythritol ester of wood or gum rosin, glycerol ester of partially dimerized rosin, glycerol ester of polymerized rosin, glycerol ester of tall oil rosin, glycerol ester of wood or gum rosin and partially hydrogenated wood or gum rosin, and partially hydrogenated methyl ester of rosin and mixtures thereof. The elastomer solvent may be employed in an amount ranging from about 10% to about 75% and preferably about 45% to about 70% by weight of the gum base.

A variety of traditional ingredients used as plasticizers or softeners such as lanolin, palmitic acid, oleic acid, stearic acid, sodium stearate, potassium stearate, glyceryl triacetate, glycerin, lecithin, glyceryl monostearate, propylene glycol monostearate, mixtures thereof, and the like, may also be incorporated into the gum base to obtain a variety of desirable textures and consistency properties. Waxes, for example, natural waxes, petroleum waxes such as polyurethane waxes, polyethylene waxes, paraffin waxes and microcrystalline waxes may also be incorporated into the gum base to obtain a variety of desirable textures and consistency properties. These traditional ingredients are generally employed in amounts of up to about 30% by weight and preferably in amounts of about 1% to about 25% by weight and most preferably in amounts of from about 3% to about 20% by weight and more preferably in amounts of about 3 to about 10% by weight of the gum base.

The gum base may include effective amounts of mineral adjuvants such as calcium carbonate, magnesium carbonate, alumina, aluminum hydroxide, aluminum silicate, talc, tricalcium phosphate, dicalcium phosphate, and the like; as well as mixture thereof. These mineral adjuvants may serve as fillers and texturizing agents.

The gum base may also include effective amounts of conventional additives such as antioxidants, preservatives, colorants and the like. For example, titanium dioxide may be utilized as a colorant, and an antioxidant such as butylated hydroxytoluene, butylated hydroxyanisole, propyl gallate, and mixtures thereof, may also be included.

The chewing gum compositions which make up the compositions of this invention may include effective amounts of conventional additives selected from the group consisting of plasticizers, softeners, emulsifiers, waxes, fillers, bulking agents, mineral adjuvants, colorings (colorants or coloring agents), antioxidants, thickeners, acidulents, mixtures thereof, and the like.

The plasticizers, softeners, mineral adjuvants, colorants, waxes, and antioxidants discussed above as being suitable for use in the gum base may also be used in the chewing gum compositions. Examples of the other conventional additives which may be used include emulsifiers, such as lecithin and glyceryl monostearate; thickeners, used alone or in conjunction with other softeners, such as methyl cellulose, alginates, carrageenan, xanthan gum, gelatin, carob, tragacanth, locust bean, and carboxy methyl cellulose; acidulents such as malic acid, citric acid, adipic acid, tartaric acid, fumaric acid, mixtures thereof, and the like; and fillers, such as those discussed above under the category of mineral adjuvants. The fillers may be used in amounts up to about 30% by weight with about 4% to about 25% by weight of the chewing gum composition being preferred.

Bulking agents suitable for use include sweetening agents selected from the group consisting of monosaccharides, disaccharides, polysaccharides, sugar alcohols, and mixtures thereof; polydextrose; maltodextrins; minerals such as calcium carbonate, talc, titanium dioxide, dicalcium phosphate, and the like; and the like. Bulking agents may be used in amounts up to about 90% by weight of the final gum composition with amounts of about 65% to about 85% being preferred.

The sweetening agent (sweetener) used may be selected from a wide range of materials including water-soluble sweetening agents, water-soluble artificial sweeteners, water-soluble sweetening agents derived from naturally occurring water-soluble sweeteners, dipeptide based sweeteners, and protein based sweeteners, including mixtures thereof. Without being limited to particular sweeteners, representative illustrations encompass:

A. Water-soluble sweetening agents such as monosaccharides, disaccharides and polysaccharides such as xylose, ribose, glucose (dextrose), mannose, galactose, fructose (levulose), sucrose (sugar), maltose, invert sugar (a mixture of fructose and glucose derived from sucrose), partially hydrolyzed starch, corn syrup solids, dihydrochalcones, monellin, steviosides, glycyrrhizin, and sugar alcohols such as sorbitol, xylitol, mannitol, maltitol, hydrogenated starch hydrolysate and mixtures thereof;

B. Water-soluble artificial sweeteners such as the soluble saccharin salts, i.e., sodium or calcium saccharin salts, cyclamate salts, the sodium, ammonium or calcium salt of 3,4-dihydro-6-methyl-1,2,3-oxathiazine-4-one-2,2-dioxide, the potassium salt of 3,4-dihydro-6-methyl-1,2,3-oxathiazine-4-one-2,2-dioxide (acesulfame-K) the free acid form of saccharin, and the like;

C. Dipeptide based sweeteners, such as L-aspartic acid derived sweeteners, such as L-aspartyl-L-

phenylalanine methyl ester (aspartame) and materials described in U.S. Pat. No. 3,492,131, L- α -aspartyl-N-(2,2,4,4-tetramethyl-3-thietanyl)-D-alaninamide hydrate, methyl esters of L-aspartyl-L-phenylglycerine and L-aspartyl-L-2,5-dehydrophenylglycine, L-aspartyl-2,5-dihydro-L-phenylalanine; L-aspartyl-L-(1-cyclohexenyl)-alanine; and the like;

D. Water-soluble sweeteners derived from naturally occurring water-soluble sweeteners, such as a chlorinated derivative of ordinary sugar (sucrose), known, for example, under the product designation of sucralose; and

E. Protein based sweeteners such as thaumatococcus danielli (Thamatin I and II).

In general, an effective amount of sweetener is utilized to provide the level of bulk and/or sweetness desired, and this amount will vary with the sweetener selected. This amount will normally be 0.01% to about 90% by weight of the gum composition when using an easily extractable sweetener. The water-soluble sweeteners described in category A above, are usually used in amounts of about 25% to about 75% by weight, and preferably in amounts of about 50% to about 65% by weight of the final chewing gum composition. Some of the sweeteners in category A (e.g., glycyrrhizin) may be used in amounts set forth for categories B-E below due to the sweeteners known sweetening ability. In contrast, the sweeteners described in categories B-E are used in amounts of about 0.005% to about 5.0% and most preferably about 0.05% to about 2.5% by weight of the final chewing gum composition. These amounts are ordinarily necessary to achieve a desired level of sweetness independent from the flavor level achieved from flavor oils.

Preferred sugar based sweeteners are sugar (sucrose), corn syrup and mixtures thereof. Preferred sugarless sweeteners are the sugar alcohols, artificial sweeteners, dipeptide base sweeteners and mixtures thereof. Preferably the sugar alcohols are used in sugarless composition because they can be used at levels which are sufficient to provide bulk as well as the desired level of sweetness. Preferred sugar alcohols are selected from the group consisting of sorbitol, xylitol, mannitol, and mixtures thereof. Most preferably sorbitol or a mixture of sorbitol and mannitol is utilized. The gamma form of sorbitol is preferred. Generally, the sugar alcohols will not exceed about 75% by weight of the composition and are usually present in amounts of about 40 to about 75% by weight of the composition. Preferably, when present, sorbitol does not exceed 70% by weight, mannitol does not exceed 15% by weight, and xylitol does not exceed 65% by weight of the composition. An artificial sweetener or dipeptide based sweetener is preferably added to the composition containing sugar alcohols in the amounts described above for their category of sweetener. Of the artificial sweeteners the saccharin salts are preferred, and of the dipeptide based sweeteners aspartame is preferred.

The flavorings (flavoring agents) that may be used include those known to the skilled artisan, such as, natural and artificial flavors. These flavorings may be chosen from synthetic flavor oils and flavoring aromatics, and/or oils, oleo resins and extracts derived from plants, leaves, flowers, fruits and so forth, and combination thereof. Representative flavor oils include: spearmint oil, cinnamon oil, oil of wintergreen (methylsalicylate), peppermint oils, clove oil, bay oil, anise oil, eucalyptus oil, thyme oil, cedar leaf oil, oil of nutmeg, oil of

sage, oil of bitter almonds and cassia oil. Also useful are artificial, natural or synthetic fruit flavors such as vanilla, and citrus oil, including lemon, orange, grape, lime and grapefruit and fruit essences including apple, pear, peach, strawberry, raspberry, cherry, plum, pineapple, apricot and so forth. These flavorings may be used individually or in admixture. Commonly used flavors include mints such as peppermint, menthol, artificial vanilla, cinnamon derivatives, and various fruit flavors, whether employed individually or in admixture.

Flavorings such as aldehydes and esters including cinnamyl acetate, cinnamaldehyde, citral diethylacetal, dihydrocarvyl acetate, eugenyl formate, p-methylamisol, and so forth may also be used. Generally any flavoring or food additive such as those described in *Chemicals Used in Food Processing*, pub 1274 by the National Academy of Sciences, pages 63-258 may be used.

Further examples of aldehyde flavorings include, but are not limited to: acetaldehyde (apple); benzaldehyde (cherry, almond); anisic aldehyde (licorice, anise); cinnamic aldehyde (cinnamon); citral, i.e., alpha citral (lemon, lime); neral, i.e. beta citral (lemon, lime); decanal (orange, lemon); ethyl vanillin (vanilla, cream); heliotropine, i.e., piperonal (vanilla, cream); vanillin (vanilla, cream); alpha-amyl cinnamaldehyde (spicy fruity flavors); butyraldehyde butter, cheese); valeraldehyde butter, cheese); citronellal (modifies, many types); decanal (citrus fruits); aldehyde C-8 (citrus fruits); aldehyde C-9 (citrus fruits); aldehyde C-12 (citrus fruits); 2-ethyl butyraldehyde (berry fruits); hexenal, i.e., trans-2 (berry fruits); tolyl aldehyde (cherry, almond); veratraldehyde (vanilla); 2,6-dimethyl-5-heptenal, i.e., Melonal (melon); 2,6-dimethyloctanal (green fruit); and 2-dodecenal (citrus, mandarin); cherry; grape; strawberry shortcake; mixtures thereof; and the like.

The amount of flavoring employed is normally a matter of preference subject to such factors as flavor type, individual flavor, gum base and strength desired. Thus, the amount may be varied in order to obtain the result desired in the final product. Such variations are within the capabilities of those skilled in the art without the need for undue experimentation. In general, amounts of about 0.05% to about 3.0% are suitable and amounts of about 0.5% to about 3.0% by weight of the chewing gum composition are useable with amounts of about 0.3% to about 1.5% being preferred and amounts of about 0.7% to about 1.2% being most preferred.

The coloring agents are used in amounts effective to produce the desired color. The coloring agents (colorants) useful in the present invention, include the pigments such as titanium dioxide, which may be incorporated in amounts of up to about 2% by weight of the gum composition, and preferably less than about 1% by weight. Colorants may also include natural food colors and dyes suitable for food, drug and cosmetic applications. These colorants are known as F.D. & C. dyes and lakes. The materials acceptable for the foregoing spectrum of use are preferably water-soluble, and include indigoid dye, known as F.D. & C. Blue No. 2, which is the disodium salt of 5,5'-indigotindisulfonic acid. Similarly, the dye known as F.D. & C. Green No. 1 comprises a triphenylmethane dye and is the monosodium salt of 4-[4-N-ethyl-p-sulfobenzylamino)diphenylmethylene]-[1-N-ethyl-N-p-sulfoniumbenzyl)- $\Delta^2,5$ -cyclohexadienimine]. A full recitation of all F.D. & C. and F.D. & C. dyes and their corresponding chemical

structures may be found in the Kirk-Othmer Encyclopedia of Chemical Technology, at Volume 5, Pages 857-884, which text is accordingly incorporated herein by reference.

The chewing gum compositions which make up the compositions of this invention may contain an edible food material which is capable of being formed into particles having microporous channels. The particles have preferred low bulk densities in the range of about 3.0 to about 8 lb./ft.³ and preferably about 3.0 to about 6.0 lb./ft.³.

The optionally included spherical particles may be produced from a wide range of materials. Without being limited thereto, illustrative materials are carbohydrates such as the dextrins, starch, pectin, algin, methyl cellulose, carboxy methyl cellulose, carboxy methyl amylose, carboxyl methylamylopectin, dextrose, fructose, maltose, lactose, dextrins, natural gums and mixtures thereof. Exemplary natural gums include tragacanth, acacia, arabic, locus bean, caraya, and carragean. Although the spherical particles are not critical, it is preferred that they be present as a means of increasing the juiciness of the chewing gum. The fine, porous nature of the spherical particles immediately absorb moisture from saliva when the chewing gum product is masticated. The particles swell and impart a juiciness to the gum.

Such materials are commercially available and may be prepared by spray drying previously expanded particles in a heated zone. For illustrative purposes, however, a preferred process for preparing the spherical particles useful in the instant formulations is described in U.S. Pat. No. 4,180,593 to Cohan, the disclosure of which is incorporated herein by reference thereto. Briefly the reference process involves spraying a flowable composition in the presence of a blowing agent, such as ammonium bicarbonate, to form beads, subjecting the beads to a heated zone to expand the beads by expansion of gases within the interior of the beads, and cooling the resulting expanded beads to stop further expansion and aid in control of bulk density.

The optionally-included spherical particles are employed in the chewing gum compositions in amounts of about 0.1% to about 12% by weight and preferably about 0.5% to about 6% by weight based on the weight of the chewing gum composition layer. Amounts less than 0.1% fail to achieve enhanced flavor and sweetness perception whereas amounts higher than 12% do not achieve a pleasing flavor sweetness release.

The preferred spherical particle for use with this invention is a maltodextrin. This maltodextrin is distinct from known maltodextrins which have distinct particle sizes and are void of a microporous channel structure. Such conventional maltodextrins or corn syrup solids as they are commonly referred to, have bulk densities from 15 to 46 lb./ft.³ and D.E. values from 7 to 38. Such materials are unsuitable for use in the present invention in lieu of the microporous particles. It should be recognized that such maltodextrins may be used in the instant formulations in addition to the spherical microporous particles. When used in this manner, they may be used in conventional amounts well known to those skilled in the art.

Although two layers having differential flavor release properties is the preferred embodiment of the multi-layered chewing gum compositions, as stated above, a multitude of layers, each having different fla-

vor release capabilities is within the intended scope of this invention.

The anhydrous chewing gum compositions may be produced in accordance with the method disclosed in U.S. Pat. Nos. 4,579,738, 4,581,234, and 4,587,125 to Cherukuri et al cited above. In brief, a method or process comprises softening the base between a temperature range of about 40° C. to about 60° C.; admixing softening agents, sweetening agents and flavoring agents; extruding the composition prior to cooling; forming the composition into suitable chewing gum pieces without cooling; and immediately wrapping the pieces with a minimum of protective wrapping without prior conditioning. No moisture or moisture-containing ingredients are used and the chewing gum composition has a final moisture content of up to about 0.9% by weight.

The chewing gum composition layers are laminated to one another in any of the techniques known in the art. For example, upon cooling the chewing gum compositions, they can be coextruded by known techniques to form a two-layer laminate. Alternatively, the two layers may be independently formed and then stacked, one upon the other, and passed through nip rolls.

Since the low gum base content layer has a quick flavor release, it will generally contain a lesser amount of flavoring agent than the high base content slower flavor release layer. However, it is within the scope of this invention to have both layers contain the same amount of flavoring or either of them may have more flavoring than the other. Similarly, different compatible flavors may be selected for inclusion in each of the different layers. For example, the first layer may contain banana; the second layer strawberry. Other flavor combinations include orange/pineapple, lemon/lime, etc.

It is also within the scope of this invention to prepare mixtures of the low gum base content and high gum base content chewing gum compositions of this invention under conditions that do not cause homogenization of the two compositions. This can be accomplished by mixing the two compositions at room temperature. For example, ropes of a low gum base content composition can be braided with ropes of a high gum base content composition and rolled into sheets. In another embodiment two or more compositions of different gum base content are coextruded into sheets in a low shear extruder to avoid homogenization.

While low gum base compositions are known to have easy bite, they are not readily handled on conventional packaging equipment. By using the combination of compositions as herein disclosed the overall chewing gum composition retains the easy bite of the low base composition and is readily handled on conventional packaging equipment.

It is within the scope of this invention to include medicaments in the low base content chewing gum composition of this invention. The medicaments or other active agents included in the composition are quickly and substantially entirely released from the gum composition upon chewing. The term active agent as used in the specification and claims means any drug, medicament or other substance taken for its medicinal or dietary properties.

Illustrative, non-limiting examples of active agents which can be incorporated in the low gum base chewing gum composition of this invention include benzocaine, phenolphthaline, laxatives, lobeline sulfate (no

smoking aid), calcium carbonate and magnesium carbonate as antacids, aspirin, fluorides for tooth decay prevention, nicotine as a smoking substitute, vitamins, minerals, caffeine, citrated caffeine, caffeine sodium benzoate, caffeine hydrochloride, appetite suppressants, and the like.

The active agent comprises about 1 to about 10% by weight of the low base content chewing gum composition, preferably about 1 to about 5% by weight, more preferably about 2% to about 4%, e.g. 3%. For example, vitamin C is included in the chewing gum composition at about 60 mg per stick, i.e., about 2.7% by weight. Appetite suppressing gums can include about 5 mg of benzocaine per stick.

While this invention has been described in terms of preparing two separate chewing gum compositions, it is within the scope of this invention to prepare a single chewing gum composition having a gum base content of about 15 to about 60% by weight, dividing the composition into two ketches and adding a diluent to one ketch to reduce its base content so that it differs by about 3 to about 15% by weight. Suitable diluents include xylitol, mannitol and sorbitol.

Those skilled in the art will appreciate that the total amount of all ingredients (components) used in the chewing gum compositions of this invention equals 100% by weight of the composition. Also, unless stated otherwise, all percents herein are percent by weight of the composition.

The following examples are illustrative only and should not be construed as limiting the invention in any way. Those skilled in the art will appreciate that variations are possible which are within the spirit and scope of the appended claims.

In the examples of the compositions of this invention that follow the chewing gum compositions were prepared by softening the gum base at about 135° F. and then blending in the lecithin for about 3 minutes. Then about 1/3 of the sweeteners along with any liquid flavoring and other ingredients were blended in for about 4 minutes with the flavor being added about 2 minutes into the 4 minute blending procedure. Finally the remaining sweeteners and any solid flavors were added in and blended for about 3 minutes and then the resulting gum composition was extruded into the desired shape. The formulations for Examples 1-4 illustrating compositions of this invention are set forth in Table I and the formulations for Examples 5 to 7 illustrating compositions of this invention are set forth in Table II.

TABLE I

Ingredients	% by wt. of Composition			
	1	2	3	4
First Layer				
Gum Base	30.0	28.5	30.0	
Maltodextrin*	4.0	4.0	4.0	
Sugar	62.175	64.45	58.25	
Dextrose	6.0	—	6.0	
Flavors	1.3	1.6	1.25	
Lecithin	0.5	0.5	0.5	
Color	0.025	0.2	—	
Malic Acid	—	0.5	—	
Citric Acid	—	0.25	—	
Second Layer				
Gum Base	34.0	32.0	34.0	
Maltodextrin*	4.0	4.0	4.0	
Sugar	52.15	61.9	52.4	
Dextrose	6.0	—	6.0	
Flavors	3.25	1.0	3.0	
Lecithin	0.5	0.5	0.5	
Color	0.1	0.1	0.1	

TABLE I-continued

Ingredients	% by wt. of Composition			
	1	2	3	4
Malic Acid	—	0.5	—	—

*Bulk density of about 3.0 to about 8 lb./ft.³

TABLE II

Ingredients	% by wt. of Composition		
	5	6	7
First Layer			
Gum Base	30.0	30.0	28.5
Maltodextrin*	4.0	4.0	4.0
Sugar	63.05	63.9	59.8
Dextrose	—	—	6.0
Flavors	1.5	1.5	1.35
Lecithin	0.5	0.5	0.5
Color	0.2	0.1	0.1
Malic Acid	0.5	—	—
Citric Acid	0.25	—	—
Second Layer			
Gum Base	37.0	37.0	37.5
Maltodextrin*	4.0	4.0	4.0
Sugar	57.2	56.9	52.15
Dextrose	—	—	6.0
Flavors	1.2	1.7	2.0
Lecithin	0.5	0.5	0.25
Color	0.1	0.1	0.1

*Bulk density of about 3.0 to about 8 lb./ft.³

Table III sets forth the flavors and colors used in Example 1-7.

TABLE III

Examples	Component	First Layer	Second Layer
1	Flavor	Spearmint blend	Spearmint blend (1)
1	Color	Green	Green
2	Flavor	Orange	Pineapple
2	Color	Yellow	Yellow
3	Flavor	Peppermint blend	Peppermint blend (2)
3	Color	—	Blue
4	Flavor	Strawberry	Vanilla marshmallow
4	Color	Red	—
5	Flavor	Orange	Pineapple
5	Color	Yellow	Yellow
6	Flavor	Banana	Strawberry
6	Color	Yellow	Red
7	Flavor	Banana	Strawberry
7	Color	Yellow	Red

(1) contains 2.0% encapsulated spearmint
(2) contains 2.0% encapsulated peppermint

In the examples that contained a different flavoring agent in the second layer than in the first, the resulting two layered chewing gum compositions upon chewing had an initial release of the first layer flavor followed by a commingling of first and second layer flavors followed by a distinct sustained second layer flavor. In the examples wherein the flavor was essentially the same in the first and second layers there was an initial flavor release and a sustained flavor release.

The invention thus being described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention and all such modifications are intended to be included within the scope of the claims.

What is claimed is:

1. A chewing gum product having at least two layers, which provides easy bite and combined quick flavor release and sustained flavor release comprising:

(a) a first layer with an anhydrous composition having a content of less than 1% by weight of moisture, a gum base content of from about 25% to

about 35% by weight of said first layer anhydrous composition, and an effective amount of flavoring agent and/or sweetener to provide quick flavor release from said product, and

(b) a second layer with an anhydrous composition having a content of less than 1% by weight of moisture, a gum base content of from about 28% to about 50% by weight, and an effective amount of flavoring agent and/or sweetener to provide sustained flavor release from said product;

said base content of said second layer being 3% to 15% greater than said base content of said first layer, whereby said combined quick flavor release and sustained flavor release are provided in said gum product.

2. The chewing gum product of claim 1 wherein said first layer has a gum base content of 27% to about 31% by weight, and said second layer has a gum base content of from about 30% to about 40% by weight.

3. The chewing gum product of claim 1 wherein the difference in gum base content between said first and second layers is from about 3% to about 10% by weight.

4. The chewing gum product of claim 1 wherein the flavoring agent is the same for said first and said second layers.

5. The chewing gum product of claim 1 wherein the flavoring agent for said first layer is different from the flavoring agent of said second layer.

6. The chewing gum product of claim 1 wherein the flavoring agents are selected from the group consisting of synthetic flavor oils, flavoring aromatics, oleoresins, extracts derived from plants, leaves, flowers and fruits, and mixtures thereof.

7. The chewing gum product of claim 1 wherein the flavoring agents are selected from the group consisting of spearmint oil, cinnamon oil, oil of wintergreen, peppermint oil, clove oil, anise oil, eucalyptus oil, vanilla, lemon oil, orange oil, grape oil, lime oil, grapefruit oil, apple essence, pear essence, peach essence, strawberry essence, raspberry essence, cherry essence, plum essence, pineapple essence, apricot essence, banana flavor, and mixtures thereof.

8. The chewing gum product of claim 1 wherein said sweetener is selected from the group consisting of water-soluble sweetening agents, water-soluble artificial sweetening agents, dipeptide based sweetening agents, water-soluble sweetening agents derived from naturally occurring water-soluble sweetening agents, protein based sweeteners, and mixtures thereof.

9. The chewing gum product of claim 1 wherein said sweetener is selected from the group consisting of xylose, ribose, glucose, mannose, galactose, fructose, sucrose, maltose, invert sugar, partially hydrolyzed starch, corn syrup solids, dihydrochalcones, monellin, steviosides, glycyrrhizin, sorbitol, xylitol, mannitol, maltitol, hydrogenated starch hydrolysate, saccharin acid, saccharin salts, cyclamate salts, acesulfame-K, L-aspartyl-L-phenylalanine methyl ester, L- α -aspartyl-N-(2,2,4,4-tetramethyl-3-thietanyl)-D-alaninamide hydrate, chlorinated derivatives of sucrose, thaumatin, and mixtures thereof.

10. The chewing gum product of claim 1 wherein said sweetener is selected from the group consisting of monoglycerides, disaccharides, polysaccharides, and mixtures thereof.

11. The chewing gum product of claim 1 wherein said sweetener is selected from the group consisting of sugar

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alcohols, artificial sweeteners, dipeptide based sweeteners and mixtures thereof.

12. The chewing gum product of claim 1 wherein there is further included at least one additional conventional gum additive selected from the group consisting of plasticizers, softeners, emulsifiers, waxes, fillers,

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bulking agents, mineral adjuvants, flavorings, colorants, antioxidants, and mixtures thereof.

13. The chewing gum product of claim 1 wherein there is only said first layer and said second layer.

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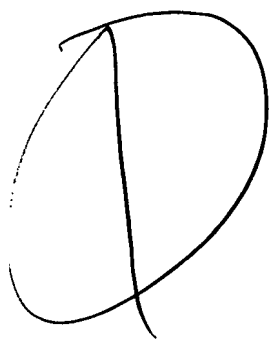
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was that he said to Smith, "My God, help me, I am shot." (Tr. at 436). Taking the evidence in the light most favorable to the state, the evidence of intent is far from overwhelming. On this record, therefore, we conclude that the error was not harmless. Accordingly, we REVERSE the district court's denial of relief and REMAND to the district court with instructions to grant the writ of habeas corpus unless the state elects to afford Hall a new trial within a reasonable period, to be determined by the district court.



BECKMAN INSTRUMENTS, INC.,
Plaintiff/Cross-Appellant,

v.

LKB PRODUKTER AB, Wallac Oy, Pharmacia LKB Nuclear Microtomy, Inc. and Pharmacia LKB Biotechnology, Inc., Defendants-Appellants.

Nos. 88-1582, 88-1583.

United States Court of Appeals,
Federal Circuit.

Dec. 13, 1989.

Defendant in patent infringement action appealed from judgment of the United States District Court for the District of Maryland, Norman Park Ramsey, J., on jury verdict that defendant infringed two claims of patent and from court's decision, 703 F.Supp. 408, to deny motion for new trial and to impose plaintiff's attorney fees and expenses upon defendant. The Court of Appeals, Rich, Circuit Judge, held that: (1) jury finding of validity and infringement with respect to method claims was consistent with finding of invalidity and non-infringement with respect to apparatus claim; (2) any jury confusion concerning availability of nonenabling references as prior art was the result of expert testimony,

not of jury instruction; (3) finding that case was exceptional for attorney fee purposes was not clearly erroneous, but award of almost \$2 million representing all of patentee's attorney fees was unreasonable; and (4) patentee's fees and expenses for experts and consultants were awardable under attorney fee provision.

Affirmed in part, vacated in part, and remanded.

1. Patents ⇨314(6)

Jury finding of validity and infringement with respect to method claims was consistent with finding of invalidity and noninfringement with respect to apparatus claims.

2. Patents ⇨16(2)

Even if reference discloses inoperative device, it is prior art for all that it teaches.

3. Patents ⇨16(2)

In order to render claimed apparatus or method obvious, prior art must enable one skilled in art to make and use apparatus or method.

4. Patents ⇨324.55(2)

While decision to award attorney fees in exceptional patent infringement cases is discretionary with trial judge, finding that case is "exceptional" is finding of fact reviewable under clearly erroneous standard. 35 U.S.C.A. § 285.

5. Patents ⇨325.11(2)

Among types of conduct which can form basis for finding patent infringement case exceptional for attorney fee purposes are willful infringement, inequitable conduct before Patent and Trademark Office, misconduct during litigation, vexatious or unjustified litigation, and frivolous suit. 35 U.S.C.A. § 285.

6. Patents ⇨325.11(5)

Conduct forming basis for finding patent infringement case exceptional for purposes of awarding attorney fees must be supported by clear and convincing evidence. 35 U.S.C.A. § 285.

7. Patents ⇨325.11(5)

Finding that patent infringement case was exceptional and warranted award of reasonable attorney fees to patentee because infringer's litigation strategy was vexatious and infringer had deliberately and repeatedly violated permanent injunction was not clearly erroneous; although specific examples of vexatious conduct recited by district court—dropping of jurisdiction defense and antitrust counterclaim and assertion of "baseless" equitable conduct defense—were somewhat tenuous, there was sufficient evidence of additional vexatious conduct on part of infringer. 35 U.S.C.A. § 285.

8. Patents ⇨324.5, 324.55(2)

District court's decision regarding award and amount of attorney fees in patent infringement case will be upheld unless it is based on error of law or clearly erroneous fact-findings or unless district court committed clear error of judgment. 35 U.S.C.A. § 285.

9. Patents ⇨325.11(5)

Award of almost \$2 million representing all of patentee's attorney fees in action against nonwillful infringer, was excessive; although infringer was guilty of engaging in vexatious litigation strategy and of deliberately violating injunctive order, lawsuit was instigated prior to any misconduct by infringer and patentee who would have incurred substantial legal expenses regardless of that misconduct, and patentee prevailed on only two of five infringement claims. 35 U.S.C.A. § 285.

10. Patents ⇨325.11(2)

When sole basis for imposing attorney fees in patent infringement case is "gross injustice" and one party prevails on some claims in issue while the other party prevails on others, this fact should be taken into account when determining amount of attorney fees; in other words, amount of fees awarded to "prevailing party" should bear some relation to extent to which that party actually prevailed. 35 U.S.C.A. § 285.

11. Patents ⇨325.11(1)

Patentee's fees and expenses for experts and consultants were awardable in patent infringement action under attorney fee provision. 35 U.S.C.A. § 285.

Donald R. Dunner, of Finnegan, Henderson, Farabow, Garrett & Dunner, Washington, D.C., argued for plaintiff/cross-appellant. With him on the brief were Roger D. Taylor and Darrel C. Karl, of Finnegan, Henderson, Farabow, Garrett & Dunner.

Robert H. Stier, Jr., of Bernstein, Shur, Sawyer & Nelson, Portland, Me., argued for defendants-appellants. Of counsel were Philip L. Cohan, of Piper & Marbury, Washington, D.C., and Charles L. Gholz, of Oblon, Fisher, Spivak, McClelland & Maier, Arlington, Va.

Before RICH, Circuit Judge,
MILLER, Senior Circuit Judge, and
ARCHER, Circuit Judge.

RICH, Circuit Judge.

Defendants LKB Produkter AB, Wallac Oy, Pharmacia LKB Nuclear Microtomy, Inc., and Pharmacia LKB Biotechnology, Inc. (collectively LKB) appeal from the judgment of the United States District Court for the District of Maryland entered upon a jury verdict that LKB infringed claims 2 and 4 of U.S. Patent No. 4,029,401 ('401). LKB also appeals from the district court's decision, reported in *Beckman Instruments, Inc. v. LKB Produkter AB*, 703 F.Supp. 408, 8 USPQ2d 1605 (D.Md. 1988), to deny LKB's motion for a new trial and to impose plaintiff's attorney fees and expenses on LKB under 35 U.S.C. § 285. Plaintiff Beckman Instruments, Inc. (Beckman) cross-appeals based upon the district court's decision not to include Beckman's fees and expenses for expert witnesses and consultants in its calculation of attorney fees. We affirm-in-part, vacate-in-part, and remand.

BACKGROUND

Patent '401 to Nather is for methods and apparatus for improving the accuracy of counting techniques in liquid scintillation counters (LSC's). LSC's are used in biological and pharmacological research to measure the amount of a radioactive tracer isotope present in a liquid biological sample. They detect light flashes or scintillations caused by radioactive emissions within the sample and convert those light flashes into electronic pulses. The electronic pulses are then sorted according to their amplitude and frequency, and displayed in a characteristic distribution curve or spectrum for the isotope being measured. The amount of the isotope present can then be calculated.

Researchers have long known that LSC's suffer from a phenomenon known as "quench". Quench is an interference with an LSC's ability to detect the full number and intensity of the scintillations in a given sample due to the sample's chemical or color content. In the mid-1960's, several groups of researchers filed patent applications on methods and apparatus which would compensate for the effect of quench. One of these applications belonged to Nather, which, after an extended prosecution including an interference proceeding, issued as the '401 patent on June 14, 1977.

LKB is in the business of making LSC's, which it sells in the United States and elsewhere. One such LSC manufactured by LKB includes an "auto window" chip within its computer hardware. This auto window chip performs the function of automatically compensating for quench in the sample.

Beckman filed its complaint on July 23, 1985, alleging that the LKB models which contain the auto window feature infringe claims 3-7 of the '401 patent. Several defenses were raised, including invalidity of the patent, inequitable conduct, and lack of personal jurisdiction over co-defendant LKB Produkter. In addition, LKB filed an antitrust counterclaim. The personal jurisdiction defense and the antitrust counterclaim were eventually dropped by LKB. The inequitable conduct defense was sev-

ered for a separate bench trial following a jury trial of the validity and infringement issues.

The jury found the three apparatus claims in issue (3, 5 and 6) invalid and not infringed and found the two method claims (4 and 7) "valid" [sic, not proved invalid] and infringed. The jury also found that the infringement was not willful and awarded damages of \$1,028,000. Upon hearing further testimony concerning the inequitable conduct issue, the court found no basis for a holding of inequitable conduct, and so entered judgment for Beckman on the jury's verdict. *Beckman Instruments, Inc. v. LKB Produkter AB*, 5 USPQ2d 1462 (D.Md.1987).

The judge also entered a permanent injunction prohibiting LKB from future infringement of the '401 patent. The exact wording of a portion of the injunction is as follows:

Defendants are further ordered, within 30 days of the effective date of this order, to deliver to counsel for plaintiffs for destruction all [auto window chips] ... which are in the defendants' possession, custody, or control within the United States....

Counsel for LKB apparently concluded that the above language gave LKB the option to ship the auto window chips out of the United States within the 30-day period instead of surrendering them for destruction. Therefore, a great many of the auto window chips in the U.S. at the date of the injunctive order were shipped to LKB's business in Finland. Ten demonstrator LSC's which included the auto window feature were allowed to remain in the United States. The district court found these activities to be a deliberate and repeated violation of the injunction. *Beckman*, 703 F.Supp. at 410, 8 USPQ2d at 1608.

Finally, the district court found the case to be "exceptional", and so awarded attorney fees and litigation expenses to Beckman under 35 U.S.C. § 285. In holding the case exceptional, the court relied on both the alleged violations of the injunction and LKB's vexatious litigation strategy. 703 F.Supp. at 410, 8 USPQ2d at 1607. The

district court awarded all of Beckman's attorney fees and expenses (totalling \$1,969,-664.44) except for those relating to the fees and expenses of expert witnesses and consultants (totalling \$409,406.10), which the court was not certain were awardable under 35 U.S.C. § 285.

OPINION

I. The Jury Verdict

[1] LKB maintains that the jury verdict should be vacated because apparatus claims 3, 5 and 6, which were found both invalid and non-infringed, are so similar to method claims 4 and 7, which were found both valid and infringed, that the jury's verdict is inherently inconsistent. As we stated in *Allen Organ Co. v. Kimball International Inc.*, 839 F.2d 1556, 1563, 5 USPQ2d 1769, 1774 (Fed.Cir.), *cert. denied*, — U.S. —, 109 S.Ct. 132, 102 L.Ed.2d 104 (1988), the issue of inconsistent jury findings is a procedural matter not unique to patent law, and as such, we apply the discernable law of the forum.

Under the law of the Fourth Circuit, when the jury's findings apparently conflict, "the court has a duty to harmonize the answers, if it is possible to do so under a fair reading of them." *Ladnier v. Murray*, 769 F.2d 195, 198 (4th Cir.1985) (citations omitted). On LKB's motion for a new trial, the district court found no conflict in the jury's findings and held that: (1) LKB had waived any objection concerning the findings on validity by failing to object to the jury instruction that "each claim of a patent ... is presumed valid independently of the validity of any other claims of the patent"; and (2) since the analysis for determining infringement is different for method claims than for apparatus claims, the jury's verdict is not so inconsistent as to be irrational. *Beckman*, 703 F.Supp. at 412-13, 8 USPQ2d at 1606. Upon review of the record before us, we are not convinced that the district court made an error of law in reconciling the jury's findings, and so affirm the denial of a new trial.

II. The Allegedly Erroneous Jury Instruction

LKB also appeals the denial of a new trial based on an allegedly erroneous jury instruction concerning the availability of non-enabling references as prior art. The particular language which LKB considers erroneous is as follows:

For the Jordan patent to anticipate claims 5 and 7 of the '401 patent, it must expressly or inherently teach the entire claim.

A prior art reference must be enabling before it can invalidate the '401 patent. That is, it must provide a description sufficient to teach a person of ordinary skill in the art how to make and use the apparatus or process. However, it is not necessary that the prior art have been actually made in order to satisfy the enablement requirement.

....

References relied upon to support a rejection for obviousness must provide an enabling disclosure. That is to say, they must place the claimed invention in the possession of the public.

LKB's objection lies not so much with the instructions itself, but with the combination of the instruction and certain expert testimony by Beckman's expert witness. Specifically, one of the issues argued at trial was whether or not the device disclosed in the Jordan patent was operable to achieve its stated goal. After presenting expert testimony that it was not, Beckman's patent expert testified as follows:

- Q. Now, assuming that their testimony on whether or not Jordan worked is credible, what impact does that have on whether Jordan can be relied on to invalidate the Nather patent?
- A. Well, a piece of prior art that doesn't work is not prior art.
- Q. What does that mean in terms of whether it can be relied on to invalidate the patent?
- A. It means it can't be relied on.
- Q. Why is that the basic rule or principle—
- A. It doesn't teach anything useful or helpful, the technology is useless.

It doesn't operate and therefore doesn't contribute anything and therefore can't be prior art to somebody else.

LKB contends that the combination of the jury instruction and the above testimony would improperly lead the jury to believe that if the Jordan device was not operable, it could be disregarded as prior art.

[2] First, the above testimony of Beckman's expert witness was clearly a misstatement of the law. Even if a reference discloses an inoperative device, it is prior art for all that it teaches. 2 D. Chisum, *Patents* § 5.03[3] (1989); *Minnesota Min. & Mfg. Co. v. Blume*, 684 F.2d 1166, 1172, 215 USPQ 585, 590 (6th Cir.1982) (dictum), cert. denied, 460 U.S. 1047, 103 S.Ct. 1449, 75 L.Ed.2d 803 (1983).

[3] Second, the jury instruction complained of is a correct statement of the law. In order to render a claimed apparatus or method obvious, the prior art must enable one skilled in the art to make and use the apparatus or method. *In re Payne*, 606 F.2d 303, 314, 203 USPQ 245, 255 (CCPA 1979). Therefore, LKB has no grounds for complaining that the jury instruction was wrong. If in fact the jury was confused by the combination of the jury instruction and the expert testimony, the fault is with the expert testimony, not the jury instruction. In such a case, LKB should not try to correct the error by objecting to the jury instruction, but by discrediting the erroneous expert testimony either through cross-examination or through its own expert testimony.

Therefore, the district court correctly denied LKB's motion for a new trial based on the allegedly erroneous jury instruction.

III. The Award of Attorney Fees

(a) Exceptional case

[4-6] 35 U.S.C. § 285 provides that the court in "exceptional cases may award reasonable attorney fees to the prevailing party." While the decision to award attorney fees is discretionary with the trial judge, the finding that a case is "exceptional" is a finding of fact reviewable under the "clear-

ly erroneous" standard. *Reactive Metals and Alloys Corp. v. ESM, Inc.*, 769 F.2d 1578, 1582-83, 226 USPQ 821, 824 (Fed.Cir. 1985). Among the types of conduct which can form a basis for finding a case exceptional are willful infringement, inequitable conduct before the P.T.O., misconduct during litigation, vexatious or unjustified litigation, and frivolous suit. *Standard Oil Co. v. American Cyanamid Co.*, 774 F.2d 448, 455, 227 USPQ 293, 298 (Fed.Cir.1985). Such conduct must be supported by clear and convincing evidence. *Reactive Metals*, 769 F.2d at 1582, 226 USPQ at 824.

[7] The district court found the case exceptional because LKB's litigation strategy was vexatious and because LKB had deliberately and repeatedly violated the permanent injunction. The court gives three examples of LKB's vexatious conduct: the jurisdiction defense which was dropped, the antitrust counterclaim which was dropped, and the inequitable conduct defense which was found to be baseless. In arguing that the court erred in finding the case exceptional, LKB maintains that we should review only the three particular examples cited by the district court. We disagree. While it is necessary for the district court to articulate the particular factual findings on which the ultimate finding of "exceptional circumstances" is based, *Id.*, when the court's finding of vexatious litigation is based on a "strategy", we do not feel that it is necessary for the district court to set forth every underlying fact which contributed to its conclusion.

Viewed individually, the specific examples of vexatious conduct recited by the district court are somewhat tenuous. In particular, we find it difficult to agree that the inequitable conduct defense was "baseless" when it survived a motion for summary judgment and was rejected only after findings were made on disputed facts (see *Beckman Instruments*, 5 USPQ2d at 1463). With respect to the other defense and counterclaim which were dropped, the mere fact that an issue was pleaded and then dropped prior to trial does not in itself establish vexatious litigation. See *Stickle*

v. Heublein, Inc., 716 F.2d 1550, 219 USPQ 377 (Fed.Cir.1983).

However, the district court's finding of exceptional circumstances is based on a *strategy* of vexatious activity. The three specific examples discussed above are clearly indicated to be merely that—examples. There is certainly sufficient evidence in the record to support a finding that there was additional vexatious conduct on the part of LKB.¹ While it is difficult to infer bad faith on the part of LKB when each action is viewed individually, when viewed together, we cannot say that the district court's finding of vexatious litigation was clearly erroneous. This is especially true considering that the district judge was in much the best position to monitor LKB's litigation "strategy."²

LKB has characterized the district court's findings concerning violation of the injunction as further examples of their alleged "vexatious conduct." However, we are satisfied that a fair reading of the district court's opinion indicates that the violations of the injunction constituted an additional basis for finding exceptional circumstances. Such activity could certainly be said to fall under the category of "litigation misconduct." And while LKB contends that the violations of the injunction occurred through honest mistake and oversight, we agree with the district court that the injunction is clear on its face. We conclude that the district court's findings concerning the violations of the injunction are not clearly erroneous.

1. For example, there is evidence in the record that LKB pleaded further defenses which were of only marginal relevance to the case, and engaged in various discovery and trial abuses. It is difficult from the "cold record" before us to get a sense of the extent of the abuses or of the good or bad faith involved. Therefore, we defer to the opinion of the trial judge who was actively involved in the proceedings.

2. LKB also contends that it was improper for the district court to consider a non-patent claim, namely the antitrust counterclaim, in a recovery under 35 U.S.C. § 285. However, in an action having both patent and non-patent claims, recovery may be had under § 285 for the non-patent claims if the issues involved therewith are intertwined with the patent issues. See *Stickle v. Heublein*, 716 F.2d at 1564, 219 USPQ at 387.

In view of the foregoing, we affirm the district court's finding that the case is "exceptional."

(b) Amounts

[8] The next step is to determine whether the district court abused its discretion in awarding fees and in setting the amount of the fees. The district court's decision will be upheld unless it is based on an error of law or clearly erroneous fact findings, or unless the district court committed a clear error of judgment. *J.P. Stevens Co. v. Lex Tex Ltd.*, 822 F.2d 1047, 1050, 3 USPQ2d 1235, 1237 (Fed.Cir.1987); *PPG Industries Inc. v. Celanese Polymer Specialties Co.*, 840 F.2d 1565, 1567, 6 USPQ2d 1010, 1013 (Fed.Cir.1988). While we find no abuse of discretion in the district court's decision to award fees, we find that the amount of the fees awarded is unreasonable, and to that extent an abuse of discretion.

[9] The purpose of § 285 when applied to accused infringers is generally said to be two-fold: one, it discourages infringement by penalizing the infringer; and two, it prevents "gross injustice" when the accused infringer has litigated in bad faith. See *Machinery Corp. of America v. Gull-fiber AB*, 774 F.2d 467, 227 USPQ 368 (Fed.Cir.1985); *Rohm & Haas Co. v. Crystal Chemical Co.*, 736 F.2d 688, 222 USPQ 97 (Fed.Cir.1984). However, we are aware of few cases in which a patent owner has been granted attorney fees solely on the basis of litigation misconduct, without a concurrent finding of willful infringement.³

Since LKB's antitrust claim was based on alleged inequitable conduct in the PTO, this is certainly the case in the present litigation.

3. In *Livesay Window Co. v. Livesay Industries, Inc.*, 251 F.2d 469, 116 USPQ 167 (5th Cir.1958), the court upheld an award of attorney fees against an infringer without a finding of willful infringement. However, in that case there was extensive evidence of litigation misconduct extending from the beginning of the lawsuit through 19 years of litigation. In *Philip v. Mayer, Rothkopf Industries, Inc.*, 204 USPQ 753 (E.D. N.Y.1979), *aff'd*, 635 F.2d 1056, 208 USPQ 625 (2nd Cir.1980), the district court awarded partial attorney fees for litigation misconduct despite a finding that the infringement was not willful. However, the court limited recovery to

In the present case, the jury explicitly found the infringement to be not willful, a finding which the trial judge did not disturb.

There being no willful infringement in this case, the purpose of discouraging infringement is not relevant. Thus, the fee award can be justified solely by the need to prevent gross injustice. Since any injustice present in this case is based upon LKB's bad faith and misconduct during litigation, the penalty imposed must in some way be related to bad faith and misconduct. While we can certainly imagine a case in which litigation misconduct would justify an award of attorney fees for the entire litigation (see *Livesay Window Co.*, supra, note 3), we are not persuaded that this is the case here.

The district court found that LKB was guilty of engaging in a vexatious litigation strategy and of deliberately violating the injunctive order. While, as related above, we do not consider this finding to be clearly erroneous, we are not satisfied that such conduct justifies imposing *all* of Beckman's attorney fees, totalling almost \$2,000,000, on LKB. The present lawsuit was instigated by Beckman prior to any misconduct by LKB, and Beckman would have incurred substantial legal expenses regardless of LKB's misconduct. In this respect, the case differs from cases in which willful infringement on the part of an infringer or inequitable conduct on the part of a patentee led to the bringing of the lawsuit. It was only after the lawsuit was begun that LKB engaged in misconduct, requiring Beckman to expend *extra* legal effort to counteract their misconduct.

To require Beckman to pay its attorneys to defend against LKB's vexatious litigation strategy and misconduct would be a gross injustice. However, that can be avoided by awarding Beckman the portion of its attorney fees which related to the vexatious litigation strategy and other misconduct. The determination of the amount of the award remains within the discretion of the trial court, since it is the trial judge who is in the best position to know how

the fees expended in responding to the infring-

severely LKB's misconduct has affected the litigation. However, the trial judge here did not in any way consider the extent of LKB's misconduct in determining the amount of damages; once the trial judge determined that the case was "exceptional," he awarded all of Beckman's attorney fees, checking only to make sure that the sum was reasonable in relation to the entire lawsuit. Accordingly, we hold that the trial judge's failure to take into account the particular misconduct involved in determining the amount of fees was an abuse of discretion.

Furthermore, while the parties did not discuss the issue on appeal, § 285 provides only for attorney fees being paid to the *prevailing* party. In the present case, Beckman accused LKB of infringing five claims of the '401 patent; of these claims, only two were found not to be invalid and to be infringed. The other three claims were found invalid and not infringed. Therefore, there is some question whether Beckman can be considered altogether a "prevailing party" for the purpose of § 285. Once again, we are given very little assistance by the case law, since very few cases have involved an award of attorney fees after a "split" jury verdict. The commentators seem to suggest, however, that the correct approach is either to deny fees entirely, or to grant fees only to the extent that a party "prevailed." See 5 D. Chisum, *Patents* § 20.03[4] (1989); A. Ahart, *Attorneys' Fees: The Patent Experience*, 57 J. Pat. Off. Soc'y 608 (1975). See also *Dixie Cup v. Paper Container Mfg. Co.*, 169 F.2d 645, 78 USPQ 222 (7th Cir.1948); *Cf. Hensley v. Eckerhart*, 461 U.S. 424, 103 S.Ct. 1333, 76 L.Ed.2d 40 (1983) (when awarding fees under 42 USC 1988, the extent to which the plaintiff succeeded must be taken into account in determining reasonable fees).

[10] When infringement is found to be willful, the policy behind § 285 of discouraging infringement might justify imposing all of the patent owner's attorney fees on the infringer, even if the infringer prevailed as to some of the claims in suit.

er's misconduct.

However, we are of the opinion that when the sole basis for imposing attorney fees is "gross injustice," and one party prevails on some claims in issue while the other party prevails on other claims, this fact should be taken into account when determining the amount of fees under § 285. In other words, the amount of fees awarded to the "prevailing party" should bear some relation to the extent to which that party actually prevailed. We hold the failure of the district court to take into account this factor in assessing fees in the present case constituted an abuse of discretion.

Since the district court abused its discretion in determining the amount of fees to be awarded, we *vacate* the award of attorney fees, and remand for a new determination of reasonable fees upon consideration of the factors discussed above.

(c) Fees of Experts and Consultants

[11] Finally, with respect to Beckman's cross-appeal, the district court refused to award Beckman's fees and expenses for experts and consultants, indicating that it was not clear to the court that such fees and expenses were awardable under § 285. In view of our decision in *Mathis v. Spears*, 857 F.2d 749, 758-59, 8 USPQ2d 1551, 1558-59 (Fed.Cir.1988), it is now clear that such fees are awardable. Therefore, on remand, the district court should take these fees and expenses into account in determining reasonable fees under § 285, subject, of course, to consideration of the other factors set forth in section III of this opinion.

CONCLUSION

The decision of the district court is *affirmed-in part, vacated-in part, and remanded*.

COSTS

Each party to bear its own costs.

AFFIRMED-IN-PART, VACATED-IN-PART, AND REMANDED



In re Diane M. DILLON.

No. 88-1245.

United States Court of Appeals,
Federal Circuit.

Dec. 29, 1989.

Patent applicant sought judicial review of decision of Board of Patent Appeals and Interferences denying, on ground of obviousness, an application for patent in tetraorthoester fuel compositions useful in reducing particulate emissions. The Court of Appeals, Pauline Newman, Circuit Judge, held that patent application could not be rejected on ground of obviousness, though compositions possessed property shared by known compositions.

Reversed.

Archer, Circuit Judge, dissented and filed opinion.

1. Patents ⇐32

Patent and Trademark Office must determine, as first step in patent examination process, whether prima facie case of obviousness has been made based on specification, prior art, and any other evidence before examiner; only if prima facie case is made need applicant adduce evidence and present argument in rebuttal. 35 U.S.C.A. § 103.

2. Patents ⇐16.25

In determining whether prima facie case of obviousness is made for new chemical compound or composition, consideration must be given to properties and utility, as well as structure, of chemical compound or composition. 35 U.S.C.A. § 103.

3. Patents ⇐36(3)

Prima facie case of obviousness is not deemed made unless new compound or composition is structurally similar to reference compound of composition, and unless

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SRI International, supra, 775 F.2d at 1122-24, 227 USPQ at 587-88. It has not on this record been shown to have been clearly erroneous.

CONCLUSION

Kodak having failed to show that the judgment portions appealed from were based on clearly erroneous findings or errors in law, the appealed portions of the judgment are in all respects affirmed.

AFFIRMED.



**In re Leonard KAPLAN and
Wellington Epler Walker.**

Appeal No. 85-2522.

**United States Court of Appeals,
Federal Circuit.**

May 6, 1986.

Joint inventors appealed from decision of the United States Patent and Trademark Office Board of Patent Appeals and Interferences, rejecting claim in their patent application on grounds of double patenting. The Court of Appeals, Rich, Circuit Judge, held that joint inventors' claim for "Homogeneous Liquid Phase Process for Making Alkane Polyols" did not constitute double patenting.

Reversed.

1. Patents ⇨120

Joint inventors' claim for "Homogeneous Liquid Phase Process for Making Alkane Polyols" did not constitute double patenting where claim was not obvious variation of one inventor's claim in prior patent. 35 U.S.C.A. §§ 102(e, g), 103, 112, 116.

2. Patents ⇨165(5)

"Domination" refers to that phenomenon, which grows out of fact that patents have claims, whereunder one patent has broad or "generic" claim which "reads on"

invention defined by narrower or more specific claim in another patent, the former "dominating" the latter because more narrowly claimed invention could not be practiced without infringing the broader claim.

See publication Words and Phrases for other judicial constructions and definitions.

Steven T. Trinker, Danbury, Conn., argued for appellant. On brief, was Norman L. Balmer, Law Dept., Union Carbide Corp., Danbury, Conn.

Harris A. Pitlick, Associate Sol., Arlington, Va., argued, for appellee U.S. Patent and Trademark Office. With him on brief, were Joseph F. Nakamura, Sol. and Fred E. McKelvey, Deputy Sol.

Before RICH, Circuit Judge, NICHOLS, Senior Circuit Judge, and NIES, Circuit Judge.

RICH, Circuit Judge.

This appeal is from the decision of the United States Patent and Trademark Office (PTO) Board of Patent Appeals and Interferences (board) rejecting, under 37 CFR 1.196(b), the single claim of appellants' application serial No. 364,221, filed April 1, 1982, entitled "Homogeneous Liquid Phase Process for Making Alkane Polyols," on the sole ground of "double patenting, because it constitutes an improper extension of monopoly for an invention claimed by Kaplan." We reverse.

Background

The Kaplan and Walker application at bar and the cited Kaplan patent, No. 3,944,588, issued Mar. 16, 1976, to one of the appellants on an application filed Jan. 2, 1975, are both assigned to Union Carbide Corporation, the real party in interest. As is apparent, the Kaplan patent application was pending only about fourteen and a half months. It was copending with the great-grandparent of the application at bar, filed Sept. 30, 1975. Its title is "Catalytic Process for Polyhydric Alcohols and Derivatives." The Kaplan patent contains one independent claim and thirteen dependent

claims. The claims most relevant here are those incorporated in dependent claim 4, which is the only claim specifically relied on by the board to support its double patenting rejection. They read as follows (emphasis ours):

1. The process of making alkane diols and triols having from 2 to 3 carbon atoms in the molecule which comprises reacting in a homogeneous liquid phase mixture of hydrogen and oxides of carbon in the presence of a rhodium carbonyl complex and a trialkanolamine borate at a pressure of from about 1000 psia to about 50,000 psia correlated with a temperature of about 100°C to about 375°C sufficient to produce said diols and triols.

2. The process of *claim 1* wherein the temperature is from about 100°C to about 300°C.

4. The process of *claim 2* wherein the reaction is effected *in the presence of an organic solvent*.

Among organic solvents disclosed and specifically claimed in the Kaplan patent are two known as "tetraglyme" (in more explicit nomenclature, dimethyl ether of tetraethylene glycol) and sulfolane. Two of the Kaplan dependent claims (10 and 11) individually name these specific solvents, respectively. No claim in Kaplan calls for a solvent *mixture*, which is significant with respect to the double patenting rejection for reasons which will appear. There are, however, a number of *examples* of mixed solvents in Table VI of the Kaplan patent specification, particularly Example 45, upon which the board relied. Example 45 is specific to a mixture of "Tetraglyme/sulfolane (65/10)." The heading of Table VI is "Triisopropanolamine Borate in Mixed Solvents."

Against this much of the background, we now reproduce the single claim on appeal of this *joint* application of Kaplan and Walker which stands rejected for double patenting in view of claim 4 of the Kaplan patent (emphasis ours):

In the homogeneous liquid phase process of producing alkane polyols by the

reaction of oxides of carbon and hydrogen in the presence of a rhodium catalyst in which rhodium is complexed with carbon monoxide to provide a rhodium carbonyl complex at a temperature between about 100°C. to about 375°C. and a pressure between about 1000 psia to about 50,000 psia, *the improvement* which comprises effecting said reaction *in a solvent mixture of tetraglyme and sulfolane* under conditions whereby such solvent mixture is essentially inert and the *rate of formation of such alkane polyol is greater* than would be obtained by effecting said reaction under equal conditions using *tetraglyme or sulfolane* as the solvent.

It will be observed from a comparison of this claim with the Kaplan claims reproduced above that the Kaplan and Walker (joint) claim at bar is, generally speaking, defined as an improvement on the Kaplan (sole) catalytic process of producing alkane polyols (diols and triols) by reacting hydrogen and carbon oxides (e.g., carbon monoxide) in an organic solvent. The reason why the process using the solvent *mixture* of the appealed claim was not *claimed* in the Kaplan patent, although it is *disclosed* in the patent specification, is that Kaplan alone was not the inventor of that process; it was the *joint* invention of Kaplan and Walker and therefore the application on appeal was filed. The reason it was *disclosed* in Kaplan's patent was that it was part of the "best mode" of practicing Kaplan's catalytic process. See 35 U.S.C. § 112, first paragraph. ("The specification ... shall set forth the best mode contemplated by the inventor of carrying out his invention.") By the time Kaplan filed his application he knew of ("contemplated") the Kaplan and Walker improvement on his own sole invention and therefore he disclosed it. It is a given, of course, that a sole inventor and joint inventors including the sole inventor are separate "legal entities," a legal proposition from which certain legal consequences flow, *In re Land and Rogers*, 368 F.2d 866, 879, 151 USPQ 621, 633 (CCPA 1966),¹ "such as who must

1. All applications involved in this case were filed and the Kaplan patent had issued before

amendment of 35 U.S.C. § 116 by P.L. 98-622 of

apply for patent." It is worth remembering an axiomatic statement on the same page of the *Land and Rogers* case, which is also applicable here:

When the joint and sole inventions are related, as they are here, inventor A commonly discloses the invention of A & B in the course of describing his sole invention and when he so describes the *invention* of A & B he is not disclosing "prior art" to the A & B invention, even if he has legal status as "another." [the reference to "another" is to that word as used in 35 USC 102(e) and (g).]

Having been filed during the pendency of the Kaplan application, the present Kaplan and Walker application with its single mixture claim had a difficult time in the PTO resulting in the passage of much time. To summarize, there were two appeals to the board prior to the appeal which resulted in the decision now before us. Three continuation applications were filed under 37 CFR 1.60. The last of these, filed Jan. 9, 1981, is the present application and was appealed to the board from the examiner's rejections under §§ 102(g), 102(a), and 103 based on the Kaplan patent and a patent to Pruett. Declarations under 37 CFR 1.131 were filed by appellants and by Kaplan explaining who invented what and when.

The board reversed all of the examiner's grounds of rejection and entered its own rejection on the ground of double patenting, as stated in the first paragraph hereof, which rejection was adhered to on reconsideration. Applicants sought reconsideration by the board "rather than reopening prosecution as is permitted under 37 C.F.R. 1.196(b)." Appellants then took this ap-

peal. Therefore, this is the first review of the board's new rejection, explicated in its two opinions.

To indicate the reasoning of the board, we quote most of the paragraph of its initial opinion in which it made its new rejection (all emphasis ours):

Under the provisions of 37 CFR 1.196(b), we reject claim 1 [there is no other] on the ground of double patenting, because it constitutes an *improper extension of monopoly* for [sic, of] an invention claimed by Kaplan. ... [A]t least claim 4 of the Kaplan patent and appellant's claim 1 *embrace* common subject matter. Both claims are generic^[2] and both claims *would be infringed* by a process which utilized rhodium and trialkanolamine borate as the catalyst and a *mixed solvent* as the organic solvent. Example 45 of the Kaplan patent clearly shows that the term solvent, as used in Kaplan's claims is intended to *embrace* the mixed solvent of Example 45. Further, appellants' claim 1 is sufficiently broad to *encompass* the use of a trialkanolamine borate in conjunction with the rhodium catalyst. Because both claims *embrace the same subject matter*, allowance of the instant application would amount to "double patenting of the improper extension of monopoly type" * as termed by Judge Almond in *In re Thornton*, 57 CCPA 759, 769, 418 F.2d 528, 537, 163 USPQ 644, 650 (CCPA 1969).

* We prefer the term "improper extension of monopoly" rather than "obviousness type double patenting" because the improper extension of monopoly occurs as a result of the *same*

sentence is the liberalization added by the 1984 amendment, which, had it been available, might have obviated the problem in this case.

2. Just what the board meant by saying "both claims are generic" is not clear to us. The claims speak for themselves. Kaplan's claim 4 defines the solvent used in the process, which is the limitation under discussion by the board, as "an organic solvent." Appellants' claim on appeal defines the solvent as "a solvent mixture of tetraglyme and sulfolane." Far from being "generic," the latter looks very much like a quite specific species of the genus "organic solvent."

Nov. 8, 1984, sec. 104(a), 98 Stat. 3384, now paragraph one of 35 U.S.C. § 116, which reads:

When an invention is made by two or more persons jointly, they shall apply for patent jointly and each make the required oath, except as otherwise provided in this title. Inventors may apply for a patent jointly even though (1) they did not physically work together or at the same time, (2) each did not make the same type or amount of contribution, or (3) each did not make a contribution to the subject matter of every claim of the patent.

The first sentence is the substance of the law at the times involved in this case. The second

Cite as 789 F.2d 1574 (Fed. Cir. 1986)

subject matter being claimed. The rejected claims [sic] before us may well be drafted so broadly as to also embrace subject matter which is unobvious over the Kaplan patent. Nevertheless, for all practical purposes, the rejected claims [sic] serve to extend the monopoly for that subject matter *embraced* by the claims which is the same as that falling within the *embrace* of the Kaplan claims.

The board then discussed *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970), a case on which appellants as well as the PTO rely before us, and continued:

Accordingly, the instant claim, which reads on subject matter disclosed in and *embraced* by the claims of the Kaplan patent, cannot be granted absent filing of a *terminal disclaimer* to prevent undue timewise extension of monopoly.

The imposition of the terminal disclaimer originated with the board in conjunction with its origination of the double patenting rejection. From the dates set forth above, it will be seen that its effect would be to cause any patent issuing on the application at bar to expire on March 16, 1993, the expiration date of the Kaplan patent, assuming a term of 17 years, so that it would have a term of less than 7 years. Appellants have refused that option. And, of course, if the board's claim analysis is correct, appellants would gain little or nothing from the patent because the invention of the appealed claim, using the mixed solvents, is already *covered* by the Kaplan patent until the date of its expiration.

Following the filing of what the board characterized as "appellants' well-drafted Request for Reconsideration," of some 20 pages, the board wrote its second opinion, discussing further *In re Vogel* and some other CCPA double patenting opinions, emphasizing the following:

The Kaplan patent deliberately chose to claim the use of organic solvents as a vehicle for carrying out the claimed process.... The Kaplan patent discloses numerous solvents ... five of which are solvent mixtures and one of which is the tetraglyme/sulfolane solvent mixture which is claimed by appellant as the essential feature of their process. Surely, the tetraglyme/sulfolane solvent of Table VI *provides some of the support* for the term "organic solvent" as used in

claim 4 of the Kaplan patent. [Emphasis ours.]

....

As indicated by the patent, the term "solvent" includes the same mixed solvent claimed by appellants. Being in some aspects the same, the subject of appellants' claims [sic] would have been *prima facie* obvious from the subject matter of the claims in the Kaplan patent. Appellants' evidence of unexpected results teaches no more than that which is disclosed in the patent and which is properly considered supportive of the claims [sic], i.e., that mixed solvents give superior yields. Appellants' evidence does not overcome the *prima facie* case and a "terminal disclaimer" is necessary....

OPINION

Double Patenting Generally

[1] We reverse the board's double patenting rejection essentially for two reasons: (1) It has confused double patenting with "domination" which, by itself, does not give rise to "double patenting" and (2) it has used the disclosure of appellants' joint invention in the Kaplan patent specification as though it were prior art, which it is not, to support the obviousness aspect of the rejection.

[2] By domination we refer, in accordance with established patent law terminology, to that phenomenon, which grows out of the fact that patents have claims, whereunder one patent has a broad or "generic" claim which "reads on" an invention defined by a narrower or more specific claim in another patent, the former "dominating" the latter because the more narrowly claimed invention cannot be practiced without infringing the broader claim. To use the words of which the board seemed to be enamored, the broader claim "embraces" or "encompasses" the subject matter defined by the narrower claim. In possibly simpler terms, one patent dominates another if a claim of the first patent reads on a device built or process practiced according to the second patent disclosure. This common-

place situation is not, per se, double patenting as the board seemed to think. *In re Sarett*, 327 F.2d 1005, 1014, 1015, 140 USPQ 474, 482, 483 (CCPA 1964). (See particularly the quotations from E. Stringham's *Double Patenting* (1933) about terms such as "covered" and "embraced.")

With respect to the board's concern about "extension of monopoly," the PTO Solicitor's brief, while supporting the board, properly deplores its use of the ambiguous word "monopoly," preferring to use the more accurate and less emotion-generating expression³ "extension of patent rights," explaining this in a footnote reading:

Both the board in this case and some prior decisions of the CCPA use the term "monopoly" in referring to the rights obtained through the grant of a patent. We prefer to refer to "patent rights" based on the rationale given by Chief Judge Markey in his article "Why Not the Statute?," 65 J.Pat.Off.Soc'y 331, 331-333 (1983).

See also *Carl Schenck, A.G. v. Nortron Corp.*, 713 F.2d 782, 218 USPQ 698, n. 3 (Fed.Cir.1983); *Kayton on Patents*, 2d ed., 1-27, "E. Patents: Property Versus Monopoly." Compare, *Robinson on Patents* (1890) Chapt. II §§ 11-44.

More to the point of the board's concern, however, one must inquire more closely than did the board: extension of what patent right? Any patent granted on the application at bar will have the single claim on appeal which is expressly limited to carrying out the Kaplan process using the specific solvent *mixture* of tetraglyme and sulfolane invented by appellants. Is this an extension of a patent on Kaplan's invention—Kaplan who never conceived of using that mixture? When Kaplan's (sole) patent expires, and assuming appellants get their joint patent, the world will still be free to use (so far as these two patents go) the Kaplan process so long as appellants' solvent mixture is not used in it. Of course, it

may be that everyone will want to use the improvement, but that is commonly the case when dominating patents expire with improvement patents still outstanding.

In further clarification of the distinction between domination and double patenting as currently understood, we repeat a passage from E. Stringham's *Double Patenting* at 207, previously quoted in *Sarett*:

One of the simplest, clearest, soundest and most essential principles of patent law, is that a later invention may be validly patented, altho [sic] dominated by an earlier patent, whether to the same or to a different inventor. No one will seriously deny the correctness of this statement, in principle. But it is incessantly lost sight of when an actual case must be decided.

"May be validly patented" of course implies that the "later invention" at least complies with the requirements for patentability found in the statute, namely, novelty, utility, and unobviousness as established by evidence of prior art, which a description of the later invention is not. Domination is an irrelevant fact.

The development of the modern understanding of "double patenting" began in the Court of Customs and Patent Appeals (CCPA) about the time of *In re Zickendraht*, 319 F.2d 225, 138 USPQ 22 (CCPA 1963), a rather unusual case in that there was no majority opinion because only two judges joined each of the two principal opinions. Neither *opinion* therein, therefore, can be regarded as controlling precedent in this court. That case is noteworthy primarily for the suggestion in a concurring opinion that the appellant might have disposed of the rejection by filing a terminal disclaimer under 35 U.S.C. § 253. This suggestion precipitated a steady stream of appeals over the next few years dealing with double patenting and the effectiveness or otherwise of terminal disclaimers which resulted in revisions of the PTO's rules,

3. The difficulty is that "monopoly" is used in different senses in patent and antitrust law, hence its ambiguity. Because of its antitrust connotations and association with illegality in connection therewith, it often evokes negative

reactions inappropriate to a dispassionate analysis of patent law problems. See *American Hoist & Derrick Co. v. Sowa & Sons, Inc.*, 725 F.2d 1350, 1367, 220 USPQ 763, 776 (Fed.Cir.1984).

guidelines, and Manual of Patent Examining Procedure on the matter. By the time of *In re Vogel*, 1970, the court saw fit to make a restatement of the law of double patenting which serves as a good starting place for deciding this case.

The first question treated in the *Vogel* restatement is whether the *same invention* is being claimed twice. If so, *Vogel* states, 35 U.S.C. § 101 prevents two patents from issuing. *In re Boylan*, 392 F.2d 1017, 157 USPQ 370 (CCPA 1968). We need not linger over this question as that is not the rejection made by the board here, notwithstanding what it said about what the claims "embrace."⁴

The second question, says *Vogel*, is: "Does any claim in the application define merely an obvious variation of an invention disclosed and claimed in the patent? In considering the question, the patent disclosure may not be used as prior art. *In re Boylan*, supra; *In re Aldrich*, 398 F.2d 855, 158 USPQ 311 (CCPA 1968)." The opinion went on to describe, and resolve, some of the logical difficulties in reaching a decision on whether there is or is not what has come to be known consistently as "obviousness-type double patenting," the ground of rejection now before us.

Should there be any doubt about the true ground of rejection before us in view of the board's stated preference for the term "improper extension of monopoly" instead of "obviousness-type double patenting," we observe that the brief of the PTO Solicitor states the issue to be whether the board was correct in rejecting the claim "on the ground of double patenting of the obviousness type." In the summary of argument is the statement: "Claim 4 [of Kaplan] and its supporting disclosure render the subject matter of the appealed claim obvious." In the argument proper, the brief says the main disagreement between appellants and

the board "appears to be the interpretation of the so-called 'second analysis question' discussed in *In re Vogel*," and that is the obviousness-type double patenting question, which we quoted above.

We will say a word about the board's desire to depart from the established terminology in the law of double patenting for the reason, quoted earlier, that "the improper extension of monopoly [i.e., of the patent right] occurs as a result of the same subject matter being claimed." The board's first opinion said it was adopting terminology from Judge Almond's opinion in *Thorington*, another CCPA case in which the court undertook to restate the law of double patenting. Reading Judge Almond's opinion will show that it recognizes two types of double patenting: same invention type and obviousness type, the main significance of the distinction being that filing a terminal disclaimer is permitted to cure an obviousness type situation but not a same invention type situation. (The fact that the board here demanded a terminal disclaimer as a condition for allowance of the claim is another indication of the true nature of its rejection.) It is also clear from Judge Almond's opinion that he was using "extension of monopoly type" as synonymous with obviousness type, merely as a way of distinguishing from same invention type double patenting.

The main reason why one cannot use "extension of monopoly" as a *type designation*, however, is that it cannot serve that purpose because the basis for *both* same invention and obviousness-type double patenting rejections is timewise extension of the patent right. All proper double patenting rejections, of either type, rest on the fact that a patent has been *issued* and later issuance of a second patent will continue protection, beyond the date of expira-

involved in this case." The opinion may be of interest, however, for what it has to say about "domination" and delay in the issuance of a second patent due to proceedings in the PTO. 784 F.2d at 356-357, 228 USPQ at 841.

4. For the latest decision of this court on the "same invention" double patenting issue see *Studiengesellschaft Kohle mbH v. Northern Petrochemical Co.*, 784 F.2d 351, 228 USPQ 837 (Fed. Cir.1986), a case in which it was expressly held that "obviousness-type double patenting is not

tion of the first patent, of the very same invention claimed therein (same invention type double patenting) or of a mere variation of that invention which would have been obvious to those of ordinary skill in the relevant art (obviousness-type double patenting). In the latter case, there must be some clear evidence to establish why the variation would have been obvious which can properly qualify as "prior art." Even if obviousness of the variation is predicated on the level of skill in the art, prior art evidence is needed to show what that level of skill was.

Obvious Variation of what Kaplan Claims

We turn now to consideration of the obviousness aspect of this obviousness-type double patenting rejection, which had to be based, of course, on what is *claimed* in the Kaplan patent. The board relied on Kaplan claim 4, which depends from claim 2, which depends from claim 1. These claims are set forth above. The board relied on the fact that claim 4 calls for "an organic solvent." The board did not say that the use of appellants' "solvent mixture of tetraglyme and sulfolane" would be obvious from claim 4. Indeed, in that portion of the board's opinion in which it reversed all of the examiner's rejections, the board held, on the record which contains appellants' declarations, that they, not Kaplan, invented the use of those mixed solvents, that appellants had antedated Kaplan as a reference under 35 U.S.C. § 102(e), that the Kaplan patent cannot be used to show obviousness under § 103, and that appellants' claim was not obvious from a cited patent to Pruett et al. It also reversed a rejection under §§ 102(g)/103 for obviousness which used Kaplan as the sole basis. Then it turned about and made an obviousness-type double patenting rejection based on Kaplan's claim 4. This rejection was predicated on the novel argument, particularly set out in the board's second opinion on rehearing, that Example 45 in Kaplan

(which is *appellants' invention*, disclosed in Kaplan's patent to conform with the best mode requirement of § 112) "provides some of the support for the term 'organic solvent' as used in claim 4 of the Kaplan patent."

Thus, after concluding that the Kaplan patent is not available to show obviousness of appellants' claimed process, the board has nevertheless used Kaplan to show obviousness in a double patenting context, for it relied on no other reference. Moreover, that part of the Kaplan disclosure used to do this is a description of appellants' joint invention. The board's claim-support theory does not suffice to justify this anomalous result. There is adequate support for the "organic solvent" limitation in claim 4 apart from appellants' specific *mixed* solvent invention, including the disclosure of the separate solvents in the mixture which are separately claimed by Kaplan. There is no way the board could have found appellants' claimed invention to be an obvious variation of what Kaplan claims except by treating the Kaplan patent disclosure as though it were prior art. This has repeatedly been held in our precedents to be impermissible. *In re Vogel*; *In re Aldrich*; *In re Boylan*, all supra. In effect, what the board did was to use a disclosure of appellants' own joint invention which had been incorporated in the Kaplan sole disclosure to show that their invention was but an obvious variation of Kaplan's claimed invention. That amounts to using an applicant's invention disclosure, which is not a 1-year time bar, as prior art against him. That is impermissible. D. Chisum, *Patents* § 3.08[2], § 5.03[3][f].

The PTO brief argues that *Vogel* sanctions such use of Kaplan's disclosure. We disagree. We do not find the factual situation here comparable to that in *Vogel*; neither was the reasoning of the board underlying the *Vogel* rejection comparable to the claim-supporting theory of the board in this case. Each double patenting rejection has to be decided on its own facts. *Vogel* dealt

IN RE KAPLAN

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Cite as 789 F.2d 1574 (Fed. Cir. 1986)

with one difficult-to-analyze situation, this case presents a different one.

There being no double patenting, the requirement for a terminal disclaimer was improper.

REVERSED.

Summary

The double patenting rejection of appellants' single claim is *reversed* because the same invention is not being claimed, and because there is no proper evidence to show that the claim is for a mere obvious variation of what is claimed in the Kaplan patent relied on to support the rejection.



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of the total amount submitted is disallowed.¹⁰ NTEU is thus entitled to recover \$14,233.75 as reasonable attorney fees under the EAJA.¹¹

GRANTED AS MODIFIED.



In re Lucas S. GORDON and Karl
M. Sutherland.

Appeal No. 83-1281.
Serial No. 124312.

United States Court of Appeals,
Federal Circuit.

May 10, 1984.

Appeal was taken from a decision of the United States Patent and Trademark Office Board of Appeals affirming an examiner's rejection of appellants' claims one to three and five to seven of application serial No. 124,312 relating to a blood filter assembly. The Court of Appeals, Jack R. Miller, Circuit Judge, held that Board failed to establish a *prima facie* case of obviousness with regard to the claims in issue.

Reversed.

Patents ⇐ 16.17

Patent and Trademark Office Board of Appeals failed to establish a *prima facie*

10. According to the affidavits submitted by NTEU, Kerry L. Adams spent 13.5 hours on research and drafting of the response to OPM's petition for rehearing, all of which is disallowed. David S. Handscher spent 20.5 hours on research and drafting of NTEU's motion to dismiss (including consideration of OPM's petition for review), one-half of which is disallowed. Both attorneys billed at \$75 per hour.

11. We reject OPM's unsupported contention that 99.5 hours is *per se* excessive for NTEU's work relating to its principal and supplemental briefs and preparation for oral argument (OPM suggests that 40 hours is "reasonable"). Similarly,

case of obviousness with regard to claims one to three and five to seven of application serial No. 124,312 relating to a blood filter assembly. 35 U.S.C.A. § 103.

James W. Geriak, Los Angeles, Cal., argued for appellants. With him on brief was Bradford J. Duft, Los Angeles, Cal.

John F. Pitrelli, Arlington, Va., argued for appellee. With him on brief were Joseph F. Nakamura, Sol. and John W. De-whirst, Associate Sol., Washington, D.C.

Before BENNETT, Circuit Judge, SKELTON, Senior Circuit Judge, and MILLER, Circuit Judge.

JACK R. MILLER, Circuit Judge.

This appeal is from the decision of the United States Patent and Trademark Office ("PTO") Board of Appeals ("board") affirming the examiner's rejection of appellants' claims¹ 1-3 and 5-7 as unpatentable under 35 U.S.C. § 103. We reverse.

THE INVENTION

Appellants claim a "blood filter assembly" used during surgery and other medical procedures involving the handling of blood to remove clots, bone debris, tissue, or other foreign materials from blood before it is returned to a patient's body. Unlike blood filter assemblies widely used in the prior art, the device of the present invention permits both entry of the blood into, and ultimate discharge of the blood out of, the *bottom* end of the filter assembly, as shown below.²

we reject OPM's contention that some of this work was "duplicative" because two attorneys researched and drafted NTEU's principal brief. We find NTEU's application for fees to be sufficiently detailed, and find that the amount claimed is reasonable under the circumstances of this appeal.

1. In application Serial No. 124,312, filed February 25, 1980, for a "Blood Filter."

2. Extraneous numbers have been removed from this and the subsequent drawing for clarification.

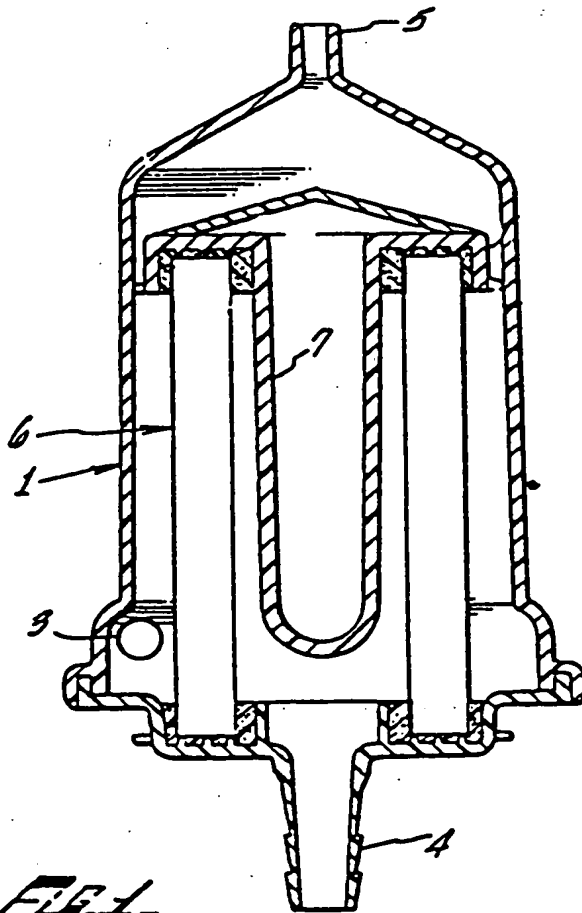


FIG. 1

The blood filter assembly comprises a shell 1 provided with blood inlet 3 and blood outlet 4. Between the blood inlet and the blood outlet is filter medium 6 positioned within the filter medium core 7.

The location of blood inlet 3 is such that the incoming blood is directed along a spirally upward path by the inner wall of the shell. Further, the location of the blood inlet at the bottom end of the filter assembly facilitates the removal of gas bubbles by allowing them to rise upwardly out of the blood. The gas bubbles so removed are released from the blood filter assembly by means of a gas vent 5 located in the region of the top end of the assembly.

Independent claim 1, from which the other appealed claims depend, is illustrative:

Blood filter assembly comprising:

- a. a shell having a first top end and a second bottom end,
- b. a blood inlet located in the region of said bottom end and opening into said bottom end,

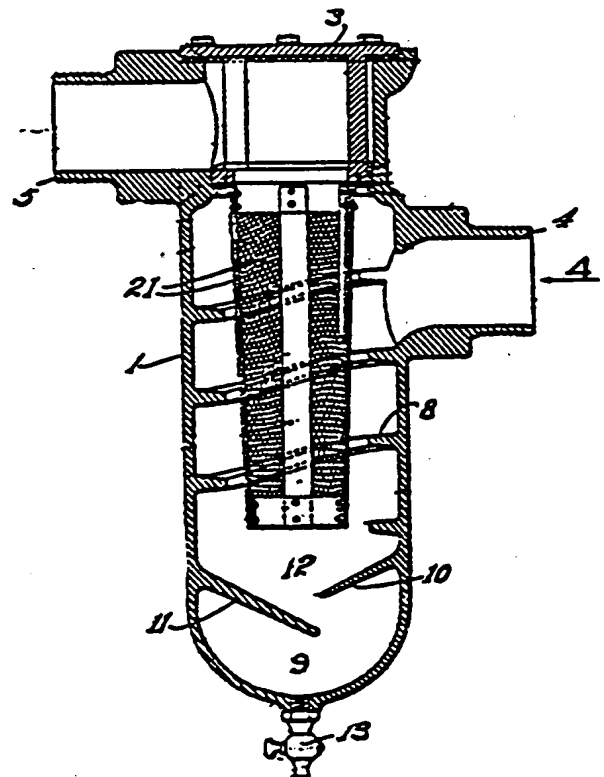
- c. a blood outlet located in the region of said bottom end,
- d. a gas vent located in the region of said top end, and
- e. a blood filter medium located between said blood inlet and said blood outlet,

said blood inlet being located and configured in a manner capable of directing incoming blood in a generally spiral path within said shell.

Claims 2, 3, and 5-7 further define the shape of the shell, the shape of the filter medium, and the nature of the material used as the filter medium.

PRIOR ART

The sole reference relied upon by the board is United States Patent No. 1,175,948, issued March 21, 1916, to French. French discloses a liquid strainer for removing dirt and water from gasoline and other light oils. As shown below, the inlet 4 and outlet 5 of the French device are both at the top end of the device.



A continuous helical tooth or thread 8 is formed integral with the inner wall of shell 1 and imparts to the incoming liquid a whirling motion, which gives the liquid a scouring action to help clean the surface of a metal screen filter 21 and guides unwanted dirt and water downwardly into a pocket 9 in the bottom of the shell. A pair of shelves 10 and 11, projecting inwardly and downwardly from the inner wall of the shell, further assists the entrance of dirt and water into the pocket 9 and prevents their being drawn back into the main chamber 12. The reference expressly states, "gravity assists in the separation of heavier oils or water." A pet-cock 13, projecting vertically downward from the bottom of the pocket is used to remove the collected dirt and water periodically. The top of the liquid strainer is completely closed by gland 3 except for the inlet and outlet openings.

BOARD OPINION

The board held that the appealed claims were drawn to an apparatus which "would have at least been rendered *prima facie* obvious to one of ordinary skill in the art by the apparatus disclosed in French." The board's reasoning was that it would have been obvious to turn the French device upside down to have both the inlet and outlet at the bottom, rather than at the top; and to employ French's "pet-cock" as the claimed "gas vent." In the board's opinion, no patentable distinction was created by viewing French's apparatus from one direction and the claimed apparatus from another.

ANALYSIS

We are persuaded that the board erred in its conclusion of *prima facie* obviousness. The question is not whether a patentable distinction is created by viewing a prior art apparatus from one direction and a claimed apparatus from another, but, rather, whether it would have been obvious from a fair reading of the prior art reference as a

whole to turn the prior art apparatus upside down. French teaches a liquid strainer which relies, at least in part, upon the assistance of gravity to separate undesired dirt and water from gasoline and other light oils. Therefore, it is not seen that French would have provided any motivation to one of ordinary skill in the art to employ the French apparatus in an upside down orientation. The mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification. See *Carl Schenck, A.G. v. Nortron Corp.*, 713 F.2d 782, 787, 218 USPQ 698, 702 (Fed.Cir.1983), and *In re Sernaker*, 702 F.2d 989, 995-96, 217 USPQ 1, 6-7 (Fed.Cir.1983), both citing *In re Imperato*, 486 F.2d 585, 587, 179 USPQ 730, 732 (CCPA 1973).

Indeed, if the French apparatus were turned upside down, it would be rendered inoperable for its intended purpose. The gasoline to be filtered would be trapped in pocket 9, and the water French seeks to separate would flow freely out of the outlet 5. Further, unwanted dirt would build up in the space between the wall of shell 1 and screen 21, so that, in time, screen 21 would become clogged unless a drain valve, such as pet-cock 13, were re-introduced at the new "bottom" of the apparatus. See *In re Schulpen*, 390 F.2d 1009, 1013, 157 USPQ 52, 55 (CCPA 1968). In effect, French teaches away from the board's proposed modification.

Because the PTO has failed to establish a *prima facie* case of obviousness, the rejection of claims 1-3 and 5-7 as unpatentable under 35 U.S.C. § 103 must be reversed.³

REVERSED.



3. Because our holding that the PTO has failed to establish a *prima facie* case is dispositive, it is

unnecessary to reach other arguments raised by appellants.

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REVERSED in part, and AFFIRMED in part.



In re Peter S. MILLS.

No. 90-1184.

United States Court of Appeals,
Federal Circuit.

Oct. 9, 1990.

Applicant appealed from order of the Board of Patent Appeals and Inferences which rejected claims. The Court of Appeals, Lourie, Circuit Judge, held that fact that referenced prior art might be capable of being modified to run the way claimed by applicant for his apparatus did not render his apparatus obvious.

Reversed.

1. Patents ⚡45

Determination of Board of Patent Appeals and Interferences that differences between the claim and machine described in prior art lay solely in the functional language of the claim suggested lack of novelty rather than obviousness. 35 U.S.C.A. §§ 102, 103.

2. Patents ⚡314(5)

Nonobviousness is a question of law to be determined from the facts. 35 U.S.C.A. § 103.

3. Patents ⚡113(6)

Board of Patent Appeals and Inferences' determination of obviousness is re-

benefits should be treated as the "final judgment" that commences the 30-day period. See *Melkonyan v. Heckler*, 895 F.2d 556 (9th Cir. 1990). While that position would seem to be contrary to *Sullivan v. Hudson*, 490 U.S. at —, 109 S.Ct. at 2255, claimants may want to be safe and file any motion for EAJA attorney's fees within 30 days of the Secretary's final decision

viewed for correctness or error. 35 U.S.C.A. § 103.

4. Patents ⚡16.24

Claim for apparatus for mixing cementitious material involving a pump means and feed means with a pumping capacity greater than the feed rate of the ingredients into the mixing chamber in order to draw air into the mixing chamber and entrain it in the mixed ingredients was not obvious in light of prior patent for mixing cementitious material through a device in which the pumping speed could be greater than the feed speed, as the prior device made no reference to producing area rated cementitious material. 35 U.S.C.A. § 103.

5. Patents ⚡16(2)

Fact that prior art apparatus may be capable of being modified to run the way claimed by another's apparatus does not render the new apparatus obvious if there is no suggestion or motivation in the reference to do so. 35 U.S.C.A. § 103.

6. Patents ⚡16(2)

On the issue of obviousness, it is not pertinent whether prior art device possesses the functional characteristics of the claimed invention if the reference does not describe or suggest its structure. 35 U.S.C.A. § 103.

James C. Wray, McLean, Va., argued for appellant.

Muriel E. Crawford, Asst. Sol., Office of the Sol., Arlington, Va., argued for appellee. With her on the brief was Fred E. McKelvey, Sol.

Before MAYER and LOURIE, Circuit Judges, and MILLER, Senior Circuit Judge.

after remand. Even a premature motion is considered timely. *James*, 783 F.2d at 998-99; *Haitian Refugee Center*, 791 F.2d at 1495. Should the claimant need to amend that petition later to reflect additional time expenditures, such time would be recoverable. *Pollgreen v. Morris*, 911 F.2d 527, 536 n. 13 (11th Cir.1990).

LOURIE, Circuit Judge.

This appeal is from the November 2, 1989, decision of the United States Patent and Trademark Office Board of Patent Appeals and Interferences (Board), Appeal No. 88-0141, affirming the examiner's rejection, under 35 U.S.C. § 103, of claims 6-9 and 11-14 in Mills' application Serial No. 891,374, a continuation of Serial No. 607-805, filed May 4, 1984, entitled "Methods of and Apparatus for Producing Aerated Cementitious Compounds." The remainder of the claims (1-5, 10, and 15) have all been cancelled. We reverse.

I

BACKGROUND

A. *The Invention*

Mills' claimed invention is an apparatus for producing aerated cementitious compositions. Claim 6 is the broadest claim:

6. Apparatus for producing an aerated cementitious composition, comprising

a mixing chamber being open to atmosphere and containing mixing means,

feed means for feeding ingredients comprising cement, foaming agent and liquid to the mixing chamber,

mixing means for mixing ingredients fed to the mixing chamber, pump means for pumping the mixed ingredients to a desired site and having a pump inlet connected to an outlet of the mixing chamber,

drive motor means connected through gearbox means providing a pumping capacity of the pump means greater than the feed rate of the ingredients to the mixing chamber provided by the feed means, such that in operation air is drawn into the mixing chamber, and entrained in the mixed ingredients.

1. The examiner rejected the claims at issue under 35 U.S.C. § 103 as being unpatentable not only over Mathis but also in view of Gibson et al. U.S. Patent 2,717,770. However, the Board affirmed the examiner's rejection of claims 6-9 and 11-14 based solely on the Mathis reference. With regard to Gibson the Board stated:

We view the teachings of Gibson at best as being merely confirmatory of the fact that

The essence of Mills' invention is the machine's ability to aerate a cementitious composition by driving the output pump at a capacity greater than the feed rate, thereby drawing air into the composition. This aeration produces a composition with substantially lower density than standard cementitious composition mixing ingredients.

B. *The Reference*

The sole reference upon which the Board relied in affirming the examiner's rejection was Mathis et al. U.S. Patent 4,117,547 (Mathis).¹ Mathis discloses a mixing chamber which is open to the atmosphere and which contains a mixing means. Two feed means for feeding ingredients in the mixing chamber are provided. The first feed means may consist of a screw conveyer and the second, a flow metering device such as an adjustable valve. A pump means pumps the mixture from the mixing chamber to a desired site and a drive motor means is connected to mixing means and pump means. A separate motor drives the feed means.

A control system exists to arrest the feed means so as not to overfill the mixing chamber. This system comprises a level detector in the mixing chamber, which signals the feed means to close when the mixing chamber stores the predetermined maximum permissible quantity of material.

C. *The Rejection*

The Board affirmed the examiner's Section 103 rejection of claims 6-9 and 11-14, "finding correspondence in the Mathis reference for all of the subject matter recited in the appellants' claims...." With regard to Mills' claim language relating to aerating the mixture, the Board stated: "[i]n our opinion, the differences between claim 6 and the Mathis machine ... lie solely in

aerated mixtures can be produced by machines in which a pump means operates upon a mixing chamber at a greater rate than the ingredients are fed thereunto² so that air is drawn into the mixing chamber and entrained in the mixed ingredients.

App. 2.

the functional language of the claim." The Board further found that Mathis teaches the use of separate input and output motors in order to permit the various mixing means and pumps to operate at different rates, and that Mathis "contemplates a situation wherein the rate of the outlet pump would be greater than the inlet pumps...." The Board concluded on this point: "[w]e are of the opinion that the Mathis machine is capable of being operated in such a fashion as to cause [the outlet] pump 18 to draw air into the mixing chamber 17 so that it is entrained in the mixture."

The Board also agreed with Mills' contention that Mathis is not directed to the problem of producing aerated cementitious material, but noted that Mills is not claiming a method, but an apparatus, and all of Mills' apparatus structure is present in the Mathis machine.

II

DISCUSSION

[1] All of the rejected claims are apparatus claims. The Board found "correspondence in the Mathis reference for all of the subject matter recited in appellants' claims" and that "[t]he Mathis machine discloses all of the structure set forth in claim 1" (a method claim not before us). It asserts that the use of such a mechanism would have been obvious and that the differences between claim 6 and the Mathis machine lie solely in the functional language of the claim, the preamble merely stating an intended use for the machine. This language suggests a lack of novelty rejection under 35 U.S.C. § 102, rather than an obviousness rejection. However, no Section 102 rejection has been made or is before us. What is before us is a rejection for obviousness, and we must decide whether the Board erred in that rejection.

[2, 3] We note first that nonobviousness is a question of law to be determined from the facts. *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1535, 218 USPQ 871, 876 (Fed.Cir.1983). We review the Board's determination of obviousness, based on the

scope and content of the Mathis reference and the differences between the Mathis reference and the Mills claims, for correctness or error. *In re Carleton*, 599 F.2d 1021, 1024 n. 14, 202 USPQ 165, 169 n. 14 (CCPA 1979).

[4, 5] After reviewing the record, the arguments in the briefs, and the Mathis reference, we conclude that Mathis would not have rendered the claimed invention obvious. The closest Mathis comes to suggesting Mills' claimed apparatus is at column 3, lines 42-47, which states

[T]he rate at which the inlet 2b receives a solid constituent depends on the speed of the feed screw 4. Such speed can be regulated by a prime mover 6 which includes a variable-speed transmission.

This brief reference contains no suggestion of "pump means and the feed means providing a pumping capacity of the pump means greater than the feed rate of ingredients to the mixing chamber provided by the feed means, such that in operation air is drawn into the mixing chamber, and air entrained in the mixed ingredients," as provided for in Mills' claim 6. While Mathis' apparatus may be capable of being modified to run the way Mills' apparatus is claimed, there must be a suggestion or motivation in the reference to do so. *See In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed.Cir.1984) ("The mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification."). We see no such suggestion. The apparatus claimed by Mills is different from that of Mathis, since the fact that motor 6 of Mathis (the feed means) can be run at a variable speed does not require that motor 20 (connected to the pump) be run at a lesser speed "such that in operation air is drawn into the mixing chamber and air entrained in the mixed ingredients."

[6] The Board found that the difference between the claimed subject matter and the prior art resided solely in functional language and that appellant had to show that the prior art device lacked the functional characteristics of the claimed device, citing

In re Ludtke, 441 F.2d 660, 58 C.C.P.A. 1159, 169 USPQ 563 (CCPA 1971). *Ludtke*, however, dealt with a rejection for lack of novelty, in which case it was proper to require that a prior art reference cited as anticipating a claimed invention be shown to lack the characteristics of the claimed invention. That proof would in fact negate the assertion that the claimed invention was described in the prior art. We are here, however, facing an obviousness issue. It is not pertinent whether the prior art device possesses the functional characteristics of the claimed invention if the reference does not describe or suggest its structure. That is the case here. Given the facts before us, we hold that the Board was in error in affirming the examiner's rejection of claims 6-9 and 11-13 as obvious in view of Mathis, and we therefore reverse the Board.

REVERSED.



GERBER GARMENT TECHNOLOGY,
INC., Plaintiff-Appellant,

v.

LECTRA SYSTEMS, INC. and Lectra
Systems, S.A.. Defendants-Appellees.

No. 89-1743.

United States Court of Appeals,
Federal Circuit.

Oct. 10, 1990.

Patent holder brought action for infringement. The United States District Court for the Northern District of Georgia, Charles A. Moye, Jr., J., granted summary judgment for defendant, holding that patent was invalid, and appeal was taken. The Court of Appeals, Markey, Circuit Judge, held that divisional application claims for fabric-cutting machines were so like cutting apparatus claim of parent ap-

plication, upon which restriction requirement had been imposed, as to be not consonant with claims not elected in responding to restriction requirement and hence invalid for obviousness-type double patenting.

Affirmed.

See also 699 F.Supp. 1576.

1. Patents ⇄120

Compliance with restriction requirement means claims in divisional application must be consonant with those not elected under that requirement.

2. Patents ⇄324.2

Even though summary judgment for defendant, determining invalidity of one of plaintiff's patents was interlocutory partial judgment not appealable absent certification, judgment would be reviewed as though it were appealable in that it formed basis for court's denial of patent holder's request for preliminary injunction, which was itself appealable. 28 U.S.C.A. § 1292(c)(1); Fed.Rules Civ.Proc.Rule 54, 28 U.S.C.A.

3. Patents ⇄120

"Obviousness-type double patenting," as ground for invalidating patent, is judge-made criterion adopted out of necessity where courts were faced with situation in which claims in two applications or patents were not drawn precisely to same invention, but were drawn to inventions so very much alike as to render one obvious in view of the other and to effectively extend the life of the patent that would have the earlier of the two issue dates.

See publication Words and Phrases for other judicial constructions and definitions.

4. Patents ⇄120

Divisional application filed as result of restriction requirement may not contain claims drawn to inventions set forth in claims elected and prosecuted to patent in parent application; divisional application must have claims drawn only to "other invention" contained in parent application. 35 U.S.C.A. § 121.

H

The word willfully means that an act is committed voluntarily and purposefully with the specific intent to do something the law forbids, that is to say, with bad purpose either to disobey or disregard the law.

Record at 336-37.

We agree with the trial court that its instruction was sufficient. In *United States v. Williams*, 728 F.2d 1402, 1404 (11th Cir.1984), we set out the relevant standard for review:

A district court's refusal to give a requested jury instruction constitutes reversible error if and only if the instruction (1) is correct; (2) is not substantially covered by other instructions which were delivered; and (3) deals with some point in the trial so important that the failure to give this instruction seriously impairs the defendant's ability to defend himself. [Citations omitted.]

We need go no further than to hold that appellant's proposed instruction number 23 was "substantially covered" by the trial court's jury charge on specific intent.

Appellant urges that two separate instructions are required because "[t]he defendant is entitled to have the court instruct the jury on his defense theory if the theory has foundation in evidence and legal support." *Id.* This is true enough where the defense theory is analytically distinct from the elements of the crime about which the jury is routinely instructed. But that is not the case here. On the contrary, appellant's PTSD theory simply represents a new approach to an old element; at its root, her claim is still that she lacked the specific intent to commit the crime with which she is charged. The defendant is entitled to put on evidence, psychological or otherwise, to show why this might be true. But the PTSD claim is a gloss on the specific intent issue that does not, in the trial court's good discretion, require a separate and distinct jury charge.

The conviction of Linda G. Cebian is AFFIRMED.

The STANDARD OIL COMPANY,
Appellant/Cross-Appellee,

v.

AMERICAN CYANAMID COMPANY,
Appellee/Cross-Appellant.

Appeal Nos. 84-1519, 84-1552.

United States Court of Appeals,
Federal Circuit.

Sept. 25, 1985.

Patentee of process used to manufacture organic chemical compound known as acrylamide brought infringement action. The United States District Court of the Eastern District of Louisiana, George Arceneaux, Jr., J., 585 F.Supp. 1481, entered judgment dismissing complaint, and patentee appealed. The Court of Appeals, Rich, Circuit Judge, held that: (1) patent claim in question was invalid for indefiniteness and obviousness and, if valid, was not infringed, and (2) case would be remanded for determination whether case was "exceptional" within meaning of statute governing award of attorney fees in patent suits.

Affirmed and remanded.

1. Patents ⇐101(5)

Validity of patent claim depends on its subject matter meeting statutory requirements for patentability and on claim, per se, being "distinct," i.e., having clear and definite meaning construed in light of complete patent document. 35 U.S.C.A. § 112.

See publication Words and Phrases for other judicial constructions and definitions.

2. Patents ⇐229

Claim, of reissue patent involving catalytic process used primarily to manufacture acrylamide, directed to process of hydrolyzing a nitrile with water in presence of copper catalyst that consists of at least partially soluble copper ion, was not in-

fringed by process used to reduce certain copper compounds to pure metallic copper to perform catalytic process that converts acrylonitrile to acrylamide using solid insoluble catalyst that is essentially metallic copper and which does not have copper ions in solution. 35 U.S.C.A. §§ 154, 271(a).

3. Patents ⇨101(7)

Claim, of reissue patent involving catalytic process used primarily to manufacture acrylamide, directed to process of hydrolyzing a nitrile with water in presence of copper catalyst that consists of at least partially soluble copper ion, was invalid for indefiniteness under 35 U.S.C.A. § 112; term "partially soluble" was too vague to particularly point out and distinctly claim the subject matter of the invention.

4. Patents ⇨16(3)

Issue of obviousness of patent claim is determined entirely with reference to hypothetical person having ordinary skill in the art; actual inventor's skill is irrelevant. 35 U.S.C.A. § 103.

5. Patents ⇨16.25

Claim, of reissue patent involving catalytic process used primarily to manufacture acrylamide, directed to process of hydrolyzing a nitrile with water in presence of copper catalyst that consists of at least partially soluble copper ion, was invalid for obviousness. 35 U.S.C.A. § 103.

6. Patents ⇨325.11(2)

Circumstances other than inequitable conduct in procurement of patent or fraud in the Patent and Trademark Office may support finding of "exceptional case" within 35 U.S.C.A. § 285, providing for award of attorney fees to prevailing party in exceptional cases; other exceptional circumstances include willful infringement, misconduct during litigation, vexatious or unjustified litigation, or frivolous suit.

7. Patents ⇨324.60

Unsuccessful patent infringement action would be remanded for determination whether, as alleged infringer contended,

the litigation was baseless and therefore "exceptional" within meaning of 35 U.S.C.A. § 285, governing award of attorney fees in patent suits.

Eben G. Crawford, Squire, Sanders & Dempsey, Cleveland, Ohio, argued for appellant/cross-appellee. With him on brief was Daniel R. Cherry, Cleveland, Ohio; Gary R. Plotecher, Standard Oil Co., Cleveland, Ohio, of counsel.

Jamie S. Smith, Allegretti, Newitt, Witcoff & McAndrews, Ltd., Chicago, Ill., argued for appellee/cross-appellant. With her on brief were Jon O. Nelson, Stephen F. Sherry and D. Dennis Allegretti, Chicago, Ill.; Gordon L. Hart, American Cyanamid Co., Stamford, Conn., of counsel.

Before RICH and DAVIS, Circuit Judges, and COWEN, Senior Circuit Judge.

RICH, Circuit Judge.

This appeal is from the final judgment of the United States District Court for the Eastern District of Louisiana, entered on May 31, 1984¹ dismissing the complaint and based on the holding that U.S. Reissue Patent No. 28,525, entitled "Process for Hydrolyzing Nitriles," assigned to plaintiff-appellant/cross-appellee The Standard Oil Co. (Sohio) by the inventors, Janice L. Greene and Murrel Godfrey, is invalid and, if valid, not infringed by defendant-appellee/cross-appellant American Cyanamid Company (Cyanamid). Cyanamid also cross-appeals from the district court's failure to award attorney fees and costs against Sohio under 35 U.S.C. § 285. We *affirm* the district court's judgment and *remand* for affirmative action on attorney fees.

Background

This patent infringement action involves a catalytic process used primarily to manufacture acrylamide ($\text{CH}_2=\text{CH}-\text{CONH}_2$),

1. This judgment, dated May 28, 1984, was entered pursuant to the court's opinion of April 10,

1984, published at 585 F.Supp. 1481, 224 USPQ 210.

which is a valuable organic chemical with a growing list of important commercial applications. It has been described by the parties hereto as the precursor for compounds used in pollution control and energy development and as "a preferred starting material" for the production of polymers used in municipal and industrial water treatment, pulp and paper processing, textile treatment, food processing, and other applications. The production of acrylamide is now a major competitive business in the United States.

Acrylamide is a monomer, made by combining a molecule of water with a molecule of acrylonitrile. Prior to the 1960's, acrylamide was produced by a two-step process, using sulfuric acid and ammonia. The two-step process had several drawbacks, consuming large quantities of sulfuric acid and ammonia while producing a relatively low yield of acrylamide and also resulting in a by-product (ammonium sulfate) not always easily or profitably disposed of.

In June, 1965, two of Sohio's research chemists applied for a patent on a one-step process which produced acrylamide from acrylonitrile by using a copper catalyst. On April 30, 1968, U.S. Patent No. 3,381,034 (the "original Greene patent") was issued to Sohio as assignee of Dr. Janice Greene and Mr. Murrell Godfrey.

In September, 1973, John Jones, one of Sohio's patent attorneys who prepared and prosecuted the original Greene patent application, learned of a 1964 Japanese article by Dr. Kenichi Watanabe (the "Watanabe article") which he felt was relevant to the validity of the original Greene patent examiner. The Watanabe article related primarily to the use of metallic nickel as a catalyst but also disclosed a catalytic conversion of an aromatic nitrile, benzonitrile, to its corresponding amide, benzamide, by using a catalyst known as Urushibara copper.

After discussing the Watanabe article with Dr. Greene, who affirmed that she had not seen the article before she and Godfrey applied for the patent, Jones filed an application on behalf of Sohio to reissue the original Greene patent. The specifica-

tion and claims of the reissue application were identical to the original Greene patent except for the removal of all references to the conversion of aromatic nitriles and benzonitrile, which the original patent had included within the invention disclosed and claimed, both generically and specifically. The examiner originally rejected all claims of the reissue application as being obvious in view of the Watanabe article. After a personal interview in which attorney Jones pointed out that the Watanabe article disclosed the use of Urushibara copper, which, he argued, is metallic copper and outside the scope of the claims in the reissue application, the examiner allowed the reissue application. The patent was reissued on August 19, 1975, as Reissue No. 28,525 (the "Greene reissue patent").

Claim 2 of the Greene reissue patent reads, in pertinent part,

The process for hydrolyzing a nitrile ... comprising contacting said nitrile with water ... in the presence of copper ion, said copper ion being at least partially soluble in water, the nitrile or in both water and nitrile and said copper ion being composed of copper in a combined valence state of $\text{Cu}^+ + \text{Cu}^+$, $\text{Cu}^+ + \text{Cu}^{++}$, or $\text{Cu}^+ + \text{Cu}^+ + \text{Cu}^{++}$

Since the original Greene patent issued in 1968, numerous patents have issued on the basic process disclosed therein. Today, every known manufacturer of acrylamide throughout the world uses a one-step process employing a copper catalyst. In the United States, acrylamide is currently manufactured by Cyanamid, Dow Chemical Company, and Nalco Chemical Company.

Sohio manufactured acrylamide through its subsidiary Vistron from 1969 to 1975 but did so using the sulfuric acid/ammonia process. Sohio has not made acrylamide since June, 1975, and has never commercially manufactured an amide from a nitrile by the process claimed in the Greene reissue patent, nor has it marketed a catalyst or had a licensee under that patent.

The Cyanamid Process

Cyanamid manufactured acrylamide from acrylonitrile and water using the sul-

furic acid/ammonia process beginning in 1954, and discontinued use of that process in 1977. Beginning in August, 1968, Cyanamid undertook a project to develop a catalytic process for the selective conversion of acrylonitrile and water solely to acrylamide. Since September, 1973, Cyanamid has operated a process using a "metallic copper catalyst," to be distinguished from copper ion, to catalyze conversion of acrylonitrile to acrylamide. The catalyst used in Cyanamid's process is essentially pure metallic copper (Cu^0 , or zero valence copper), produced by passing hydrogen gas over pellets composed of copper compounds to reduce them to metallic copper. Although Cyanamid takes steps to insure that no copper ions (Cu^+ or Cu^{++} , copper with a valence number of one or two) are introduced into the process, tests of Cyanamid's reactor effluent showed that it contained minute quantities of soluble copper ions, on the order of one or two parts per million, referred to by the trial judge as "minute."

In October, 1974, Sohio believed that Cyanamid might be using its patented process in its commercial acrylamide plant in Fortier, Louisiana. Although Sohio offered Cyanamid a license under the original Greene patent in December, 1974, Cyanamid took the position that it did not need a license, and there were no further negotiations between the parties. Sohio filed this suit on April 16, 1980, after reissuing its patent, seeking compensation for patent infringement in the form of a reasonable royalty and, in addition, seeking increased damages and attorney fees for willful infringement. Cyanamid denied infringement and counterclaimed for a declaration that the Greene reissue patent is invalid and unenforceable because of fraud and also sought an award of attorney fees against Sohio for bringing a "baseless infringement suit."

The District Court's Opinion

Trial was to the court without a jury. Sohio asserted infringement of only claim 2 of the Greene reissue patent. We shall

now briefly summarize the court's extensive opinion.

The district court held that the Greene reissue patent was not infringed by Cyanamid. While Sohio's patented process makes use of copper ions that are "at least partially soluble in water, the nitrile or in both water and nitrile," the court specifically found that the catalyst used by Cyanamid is not "at least partially soluble" and also found that the Cyanamid metallic copper catalyst was specifically disclaimed by Sohio in its reissue application.

The court also held that the Greene reissue patent was invalid because it did not satisfy the disclosure requirements of 35 U.S.C. § 112 and because the claimed invention was obvious under 35 U.S.C. § 103. The court found (with some confusion on its part discussed infra) that the term "at least partially soluble" as used in claim 2 did not meet the "full, clear, concise and exact" requisites of the first paragraph of § 112 and also held that "partially soluble" was too vague to meet the requirement that the inventor shall particularly point out and distinctly claim the invention, as required by the second paragraph of § 112.

The court went on to hold claim 2 invalid for obviousness under § 103 based on two prior art references, U.S. Patent No. 1,891,055, issued in December, 1932, to Walter Reppe (the "Reppe patent") and the Watanabe article. After examining the disclosures in these references, the court concluded that, when read together, they rendered the invention of claim 2 obvious within the meaning of § 103.

Finally, the court determined that the facts did not support a holding of "egregious conduct" or fraud committed by Sohio either in procuring its patent or in bringing the infringement suit. It was apparently on this basis that the court made no award of attorney fees to the prevailing party, Cyanamid.

The opinion having been filed, judgment was thereafter entered simply dismissing the complaint with prejudice.

OPINION

A. *Infringement*

A patent confers the right to exclude others from making, using, or selling the invention defined by the claims. 35 U.S.C. § 154. A determination of patent infringement under 35 U.S.C. § 271(a) involves a two-step analysis of each asserted claim: first, the language of the claim must be interpreted; and second, it must be determined whether the claim "reads on" the accused product or process, that is, whether the claimed invention is being made, used, or sold by the alleged infringer. The first is a question of law for the court, the second an issue of fact. See *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 771, 218 USPQ 781, 788-89 (Fed.Cir.1983).

[1] The requirements for the specification and claims are separately set forth in the first two paragraphs of 35 U.S.C. § 112 (emphasis ours):

The *specification* shall contain a written *description* of the invention, and of the manner of making and using it, in such full, clear, concise and exact terms *as to enable* any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the *best mode* contemplated by the inventor of carrying out his invention.

The specification shall conclude with *one or more claims* particularly pointing out and *distinctly claiming* the subject matter which the applicant regards as his invention.

The allowability, or validity, of a claim depends, of course, on its subject matter meeting the statutory requirements for patentability and on the claim, per se, being "distinct"—i.e., having a clear and definite meaning when construed in the light of the complete patent document.

The second paragraph of § 112 deals with the claims only. The first paragraph does not apply to claims but to "written description." It requires that the inventor

adequately disclose three separate items: (1) the invention itself (the "description" requirement); (2) the manner and process of making and using the invention (the "enablement" requirement); and (3) the best mode contemplated by the inventor, at the time of filing, in carrying out the invention (the "best mode" requirement). The descriptive part of the specification aids in ascertaining the scope and meaning of the claims inasmuch as the words of the claims must be based upon the description. The specification is, thus, the primary basis for construing the claims.

Finally, the prosecution history (sometimes called "file wrapper and contents") of the patent consists of the entire record of proceedings in the Patent and Trademark Office. This includes all express representations made by or on behalf of the applicant to the examiner to induce a patent grant, or, as here, to reissue a patent. Such representations include amendments to the claims and arguments made to convince the examiner that the claimed invention meets the statutory requirements of novelty, utility, and nonobviousness. Thus, the prosecution history (or file wrapper) limits the interpretation of claims so as to exclude any interpretation that may have been disclaimed or disavowed during prosecution in order to obtain claim allowance.

In its interpretation of claim 2 of the Greene reissue patent, the district court found that claim 2 is directed to a "process of hydrolyzing a nitrile with water" in the presence of a copper catalyst that consists of "a copper ion" which is "at least partially soluble." The key to interpreting claim 2 is, therefore, determining the exact nature of the "copper ion" catalyst used in the process.

The district court noted that the specification of the Greene reissue patent expressly states that "metallic copper when used alone is ineffective" in the process.² In addition, the court noted that attorney Jones' response to the examiner's rejection

2. While the record shows that this was the opinion of the patentees on the basis of their limited

research, the record also shows that they were mistaken in their belief.

of all claims in the reissue application pointed out that Watanabe disclosed the use of Urushibara copper, which "is in fact metallic copper which is outside [the] claims" of the reissue application. By making this disclaimer or concession, Sohio surrendered any interpretation of its claim that would include metallic copper catalysts.

In determining whether the claim as thus interpreted reads on the Cyanamid process, the district court found that the Cyanamid process involved a "painstaking procedure to reduce certain copper compounds to pure metallic copper to perform a catalytic process that converts acrylonitrile to acrylamide," and that Cyanamid's catalyst "is a solid, insoluble catalyst, comprised of metallic copper, as pure as industrial chemical methods are capable of producing."

[2] Comparing the two processes, the court found that the Greene reissue patent describes a catalyst that has copper ions in solution (a homogenous catalyst), while the Cyanamid catalyst does not have copper ions in solution. The Cyanamid catalyst is, rather, a solid insoluble catalyst that is essentially metallic copper. The court properly concluded there was no infringement by Cyanamid on the basis of Sohio's disclaimer of the use of metallic copper and also because Cyanamid's catalyst was not "at least partially soluble in water, the nitrile, or in both water and nitrile" within the meaning of claim 2. We agree with this interpretation and finding of non-infringement and therefore affirm it.

B. Validity

We now turn to the issue of validity of claim 2 of the Green reissue patent. Section 282 of Title 35 provides that a party charged with infringement may assert several bases for invalidity, including "any ground stated in part II of this title as a condition for patentability" (i.e., failure to satisfy, inter alia, any one of the requirements of novelty, utility, or nonobviousness, §§ 101, 102, and 103) and "failure to comply with any requirement of Sections 112 or 251 of this title."

The district court held claim 2 of the Greene reissue patent invalid for both indefiniteness under § 112, second paragraph, and for obviousness under § 103. We affirm both holdings.

1. Indefiniteness

[3] The district court concluded that claim 2 was invalid because the term "partially soluble" was insufficiently precise to meet the "full, clear, concise and exact" requirement of 35 U.S.C. § 112, first paragraph (the enablement requirement), which was a misapplication of the statute, and also correctly concluded that "partially soluble" was too vague to "particularly point out and distinctly claim" the subject matter of the invention as required by the second paragraph of § 112, the claim requirement.

Although we agree claim 2 is invalid because of its failure to satisfy the requirement of distinctly claiming the invention, we point out that the first paragraph of § 112 applies only to the disclosure portion of the specification, not to the claims. The error was harmless, however, because the court also applied the right statutory provision.

We affirm this ground for holding claim 2 invalid.

2. Obviousness

A patent may also be held invalid if the invention claimed does not satisfy the requirement for nonobviousness, 35 U.S.C. § 103, which reads:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Graham v. John Deere Co., 383 U.S. 1, 17-18, 86 S.Ct. 684, 693-94, 15 L.Ed.2d 545, 148 USPQ 459, 467 (1966), thus articulated

the test for determining obviousness under § 103:

[T]he scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the art resolved. Against this background, the obviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or nonobviousness, these inquiries may have relevancy.

In considering the obviousness issue, the district court stated that "a hypothetical inventor is envisioned as working in his shop with all the prior art references—which he is presumed to know—hanging on the walls around him," citing in support a 1982 District of Delaware opinion.³ The court then proceeded, however, to determine that the real inventor, Dr. Greene, possessed the requisite skill, "by virtue of her Ph.D. in Chemistry," to be personally charged with knowledge of both of the prior art references, the Reppe patent and the Watanabe article. While the court's holding that claim 2 of the Greene reissue patent defined an obvious invention was correct, the court's reasoning in reaching that conclusion was based on some all-too-often misconstrued and now obsolete principles of the obviousness inquiry.

[4] The issue of obviousness is determined entirely with reference to a *hypothetical* "person having ordinary skill in the art." It is only that hypothetical person who is presumed to be aware of all the pertinent prior art. The actual inventor's skill is irrelevant to the inquiry, and this is for a very important reason. The statutory

emphasis is on a person of *ordinary* skill. Inventors, as a class, according to the concepts underlying the Constitution and the statutes that have created the patent system, possess something—call it what you will—which sets them apart from the workers of *ordinary* skill, and one should not go about determining obviousness under § 103 by inquiring into what *patentees* (i.e., inventors) would have known or would likely have done, faced with the revelations of references. A person of ordinary skill in the art is also presumed to be one who thinks along the line of conventional wisdom in the art and is not one who undertakes to innovate, whether by patient, and often expensive, systematic research or by extraordinary insights, it makes no difference which. See the last sentence of § 103, *supra*.

It was up to the court here to determine the level of skill of the hypothetical person of *ordinary* skill and what that person would have been able to do when in possession of the prior art, the scope and contents of which the court has also determined. For a more extensive, and the latest, discussion of this court's views on *who* is presumed to know the prior art, see *Kimberly-Clark Co. v. Johnson & Johnson*, 745 F.2d 1437, 1449-1454, 223 USPQ 603, 610-614 (Fed.Cir.1984).

[5] Although the court here correctly determined the level of skill and prior art questions, the court's discussion of what skill Dr. Greene possessed was beside the point for the reasons discussed in *Kimberly-Clark*. The relevant inquiry was the court's assessment of the two prior art references. In that regard, the court specifically found that the Reppe patent discloses the use of a metallic copper catalyst to convert a nitrile to an amide. Example 2 of Reppe discloses conversion of an aliphat-

3. This visual imagery originated, however, in 1966 in our predecessor court in the case of *In re Winslow*, 365 F.2d 1017, 151 USPQ 48 (CCPA 1966). It has attained an unfortunate popularity with the judiciary. In the nearly two decades since that opinion, this court and the CCPA considerably modified their views. As may be

seen from *Winslow*, the picturesque phraseology was born out of a disagreement with the late Judge Arthur Smith who vigorously dissented on the obviousness issue. It was rather promptly modified by the CCPA in *In re Antle*, 444 F.2d 1168, 168 USPQ 717 (CCPA 1971).

ic nitrile to a small amount of aliphatic amide using a metallic copper catalyst. The Watanabe article teaches that a type of metallic copper, Urushibara copper, is a useful catalyst for converting at least one aromatic nitrile, benzonitrile, to its corresponding amide, benzamide. The court found that the combined teachings would have indicated to one of ordinary skill in the art that copper was an effective agent for producing a catalysis in the process of converting a nitrile to an amide.

Sohio contends that the district court ignored secondary indicia of nonobviousness, including the fact that "every known manufacturer of acrylamide now uses a one-step catalytic process." However, the fact is that Sohio has never licensed the Greene reissue patent to any of these manufacturers, and Sohio itself never used the process commercially. There evidently being no "secondary considerations" respecting the actual invention of claim 2, the district court's conclusion of obviousness of the subject matter of claim 2 was entirely correct.

C. Attorney Fees

Section 285 of Title 35 provides that a district court "in exceptional cases may award reasonable attorney fees to the prevailing party." In this case, both parties sought attorney fees in the court below, Sohio accusing Cyanamid of willful infringement and Cyanamid accusing Sohio of bringing a "baseless" infringement suit. Cyanamid also asserted that Sohio consciously failed to disclose the Watanabe reference during prosecution of the original patent application and misrepresented to the PTO the date when it first became aware of the Watanabe reference.

[6] The district court found that neither Dr. Greene nor any other agent of Sohio was guilty of fraud or gross negligence in the PTO, concluding instead that a finding of simple negligence or oversight was more appropriate. Although a finding of inequitable conduct or "fraud in the Patent and Trademark Office" is often a basis for a district court to find that a case is "excep-

tional," it is not a prerequisite to an award of attorney fees under § 285.

Circumstances other than inequitable conduct in the procurement of a patent may support a finding of an "exceptional" case. Other exceptional circumstances include willful infringement, misconduct during litigation, vexatious or unjustified litigation, or a frivolous suit. *See, e.g., Bayer Aktiengesellschaft v. Duphar International Research B.V.*, 738 F.2d 1237, 1242, 222 USPQ 649, 652 (Fed.Cir.1984); *Hughes v. Novi American, Inc.*, 724 F.2d 122, 125, 220 USPQ 707, 710 (Fed.Cir.1984); *Stickle v. Heublein, Inc.*, 716 F.2d 1550, 1564, 219 USPQ 377, 387 (Fed.Cir.1983); *Orthopedic Equipment Co. v. All Orthopedic Appliances*, 707 F.2d 1376, 1384, 217 USPQ 1281, 1287 (Fed.Cir.1983).

[7] The district court, so far as we can determine, made no definitive finding on the issue of exceptional case and did not specifically deny an award of attorney fees to the prevailing party, Cyanamid. Because a court may award attorney fees in a case where circumstances demonstrate that litigation is baseless, as Cyanamid contends it is here, we remand this case to the district court for a determination of whether it is exceptional within the meaning of § 285 and in light of the foregoing precedents.

CONCLUSION

The judgment of the district court with respect to the issues of validity and infringement is *affirmed*, and the case is *remanded* to the district court to determine whether an award of attorney fees to the prevailing party under § 285 is warranted.

AFFIRMED AND REMANDED.



I

APPENDIX—Continued

EXHIBIT 6

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATIONDATE: August 29, 1981RECEIVED
FEDERAL TO:

SUBJECT:

Airport Traffic Control Tower
Andrews Air Force Base
Camp Springs, MD 20334TO: Linda Rose

Your letter dated August 19, 1981 requesting additional time in which to respond to your notice of intended removal issued August 9, 1981 was received in this office on August 20, 1981.

Since substantially more than the allowed seven days had expired without any response from you, I issued the decision letter on August 18, 1981. The decision letter was forwarded to you by first class and certified mail August 18, 1981.

However, we have carefully considered your request and find no reason to alter our decision.

The material relied upon to support the decision is available for review at Andrews AFB Control Tower, Camp Springs, Maryland. If you wish to review this material, please contact me.

Charles Neugebauer
CHARLESAN NEUGEBAUER
Chief, Andrews Tower



CUSTOM ACCESSORIES, INC.,
Plaintiff-Appellant,
v.
JEFFREY-ALLAN INDUSTRIES, INC.,
Defendant-Appellee.
Appeal No. 85-2728.
United States Court of Appeals,
Federal Circuit.
Dec. 12, 1986.

Patent holder brought infringement action. The United States District Court for the Northern District of Illinois, James B. Moran, J., determined that claims of patent for mud flap and splash guard assemblies were obvious and invalid. Holder appealed. The Court of Appeals, Edward S. Smith, Circuit Judge, held that: (1) old or unpatentable nature of each element in

claimed invention for mud flap or splash guard assemblies did not determine that invention was obvious and that patent was invalid; (2) District Court was required to consider objective evidence of nonobviousness, which included evidence of copying and commercial success; and (3) District Court failed to make sufficient, required findings with regard to scope and content of prior art, differences between prior art and claims at issue, level of ordinary skill in art, and objective evidence of nonobviousness.

Vacated and remanded.

1. Patents $\Rightarrow 26(1\frac{1}{4})$

Old or unpatentable nature of each element in claimed invention for mud flap or splash guard assemblies did not determine that invention was obvious as a whole

and that patent was invalid. 35 U.S.C.A. § 103.

2. Patents ⇐16.9

Finding that invention is improvement is not prerequisite to patentability. 35 U.S.C.A. §§ 100-103.

3. Patents ⇐36.1(2), 36.2(1)

Trial court deciding obviousness of patent for mud flap and splash guard assemblies was required to consider objective evidence of nonobviousness, which included evidence of copying and commercial success; rejecting *Dual Mfg. & Eng'g, Inc. v. Burris Indus., Inc.*, 619 F.2d 660 (7th Cir.); *Republic Industries, Inc. v. Schlage Lock Co.*, 592 F.2d 963 (7th Cir.). 35 U.S.C.A. § 103.

4. Patents ⇐36.1(1)

Absence of objective evidence of nonobviousness does not preclude holding of nonobviousness, in that objective evidence of nonobviousness is not prerequisite to patentability. 35 U.S.C.A. § 103.

5. Patents ⇐36(2)

Alleged infringer of patent for splash guard and mud flap assemblies had burden to prove obviousness and invalidity of each claim by clear and convincing evidence. 35 U.S.C.A. §§ 103, 282.

6. Patents ⇐112.4

Trial court deciding obviousness of invention for splash guard and mud flap assemblies was required to consider result of reexamination proceeding in Patent and Trademark Office, which upheld validity of patent claims despite presence of similar art that was also presented before district court. 35 U.S.C.A. §§ 103, 282.

7. Patents ⇐314(6)

District court determining obviousness of invention for splash guard and mud flap assemblies failed to make sufficient, required findings with regard to scope and content of prior art, differences between prior art and claims at issue, level of ordi-

nary skill in art, and objective evidence of nonobviousness. 35 U.S.C.A. § 103.

8. Patents ⇐16(3)

Actual inventor's skill is not determinative in deciding whether invention was obvious to person having ordinary skill. 35 U.S.C.A. § 103.

9. Patents ⇐16(1)

Factors to be considered in determining level of ordinary skill in art in order to determine whether patent is obvious include type of problems encountered in art, prior art solutions to problems, rapidity with which innovations are made, sophistication and technology, and educational level of active workers in field. 35 U.S.C.A. § 103.

10. Patents ⇐324.60

Inadequacy of findings by district court to enable determination whether invention for mud flap and splash guard assemblies was obvious justified remand. 35 U.S.C.A. § 103.

Richard D. Harris of Dick & Harris, Chicago, Ill., argued for plaintiff-appellant. With him on the brief were Richard Eugene Dick and Max Shaftal of Dick & Harris, Chicago, Ill.

John C. Brezina of Brezina & Buckingham P.C., Chicago, Ill., argued for defendant-appellee. With him on the brief was David C. Brezina, of Brezina & Buckingham P.C., Chicago, Ill.

Before DAVIS and SMITH, Circuit Judges, and RE, Chief Judge.*

EDWARD S. SMITH, Circuit Judge.

This is an appeal by Custom Accessories, Inc. (Custom), from a judgment of the United States District Court for the Northern District of Illinois, Eastern Division, holding invalid under 35 U.S.C. § 103 claims 1 and 6 of United States Patent No. 4,264,083 (the '083 patent). We vacate and remand.

designation.

* The Honorable Edward D. Re, Chief Judge, United States Court of International Trade, sitting by

Background

The facts recited in this opinion, unless otherwise indicated, are either uncontested by the parties or are findings of the district court not shown to have been clearly erroneous. FED.R.CIV.P. 52(a).

1. The Technology

Mud flap or splash guard assemblies are commonly used on motor vehicles to prevent damage to the frame due to pebbles, salt, mud, and other debris thrown from the vehicle path by rotating wheels. They are placed in close proximity to a wheel and occupy a rearward position relative to the primary direction of travel of the motor vehicle. The assembly usually includes a splash intercepting body portion, such as a flat resilient flap or a rigid metallic plate of light construction, anchored by a fastener to a fender area of the vehicle.

2. The Patent

The '083 patent was issued on April 28, 1981, to Matthew, *et al.*, and was assigned to Custom. A reissue patent application was filed on June 23, 1981, in the name of the original inventors. On February 19, 1982, Pretty Products, Inc., filed a request for reexamination in light of nine references not considered during prosecution. On June 3, 1982, the United States Patent and Trademark Office (PTO) merged the reissue application with the reexamination proceeding. Custom then expressly abandoned the reissue application on June 17, 1982. Original claims 1 and 6 were amended during, and ultimately survived, reexamination. A reexamination certificate including those claims was issued on March 22, 1983.

Claim 1 reads as follows:

1. A splash guard or mud flap assembly for attachment to the fender of a motor vehicle, comprising: a flexible, splash-intercepting body portion: resilient, self-sustaining anchoring means for supporting the body portion and being adapted to be snugly engaged along the fender of a motor vehicle for securing the body portion in a splash-intercepting

position thereon, said anchoring means including a front wall and a back wall resiliently integrally joined along one side in substantial overlying relation to one another and converging in the direction of the free ends thereof, the free ends of said walls being resiliently separable a distance to enable the anchoring means to be snugly frictionally engaged on a motor vehicle fender, the resiliency of the anchoring means being such that the front wall and the back wall thereof provide substantially the total gripping force for maintaining the anchoring means on a motor vehicle fender while providing a rigid support base for the splash-intercepting body portion of the splash guard, and an outwardly extending pin-like member carried on the front wall of the resilient anchoring means in spaced, inward relation to the free ends of said walls of the anchoring means for engaging and retaining said body portion on the anchoring means, said pin-like member being provided with locking means for securing and maintaining the splash-intercepting body portion on the anchoring means, said locking means being characterized in that it overlies and is in contact with a sufficient area of the splash-intercepting body portion to resist any forces tending to dislodge said body portion from the pin-like member.

Claim 6 recites:

A splash guard or mud flap assembly as claimed in claim 1 wherein the pin-like member of the anchoring means is provided with external threads for receiving a nut-like retaining member for securing and maintaining the splash-intercepting body portion on the anchoring means, said nut-like retaining member being characterized in that the base of the nut-like retaining member overlies and is in contact with a sufficient area of said body portion to resist any forces tending to dislodge the body from the pin-like member.

3. District Court Proceeding

Custom filed suit in the district court alleging infringement by appellee Jeffrey-

Allan Industries, Inc. (Jeffrey-Allan). Jeffrey-Allan denied infringement. It also raised as affirmative defenses and counter-claimed that claims 1 and 6 were invalid on the grounds of obviousness under 35 U.S.C. § 103, improper inventorship under 35 U.S.C. § 102(f), and overclaiming under 35 U.S.C. § 112.

The district court judge entered judgment for Jeffrey-Allan for the reasons contained in a July 26, 1985, "Memorandum and Order" that constituted the court's findings of fact and conclusions of law. The district court found claims 1 and 6 of the '083 patent invalid under 35 U.S.C. § 103,¹ but did not adjudicate any other issue. The Memorandum and Order does state, however, that "[d]efendant does not seriously contend that its splash guard assembly does not infringe."

Issue

Whether the district court erred in holding that claims 1 and 6 of the '083 patent are invalid under 35 U.S.C. § 103.

Opinion

Section 103 of 35 U.S.C. precludes a patent grant

if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. * *

Though the ultimate question is one of law, a determination of obviousness under section 103 is based on these factual inquiries set forth in *Graham v. John Deere Co.*:² (a) the scope and content of the prior art;

(b) the differences between the prior art and the claims at issue; (c) the level of ordinary skill in the art; and (d) objective evidence of nonobviousness.³

Under *Graham*, a district court makes proper fact findings on those four inquiries and then assesses the ultimate legal question of nonobviousness. Thus, given the scope and content of the prior art, the differences between the claimed invention and the prior art, the level of ordinary skill in the art, and the existence of commercial success and any other objective considerations of nonobviousness, the district court determines whether the claimed invention would have been obvious to one of ordinary skill in the appropriate art at the time the invention was made.

At the conclusion of its 7½ page Memorandum and Order, the district court for the first time cites *Graham*, stating:

This court concludes, in accordance with the teachings of *Graham v. John Deere Co.*, 383 U.S. 1, 86 S.Ct. 684, 15 L.Ed.2d 545 (1966); *Dual Mfg. & Engineering, Inc. v. Burris Industries, Inc.*, 619 F.2d 660 (7th Cir.) (*en banc*), *cert. denied*, 449 U.S. 870, 101 S.Ct. 208, 66 L.Ed.2d 90 (1980) and *Republic Industries, Inc. v. Schlage Lock Co.*, 592 F.2d 963 (7th Cir. 1979), that the use of that anchoring means rather than another in an old combination was, in the circumstances of this case, obvious within the meaning of section 103.

That fleeting reference to *Graham* does not convince us that the district court in fact properly analyzed obviousness using the *Graham* analysis. Indeed, Custom has persuaded us to the contrary. That *Graham* was not properly applied is evidenced

1. The Memorandum and Order actually concluded that the use of Custom's "anchoring means rather than another in an old combination was * * * obvious." We presume the district court implicitly concluded that the inventions claimed by claims 1 and 6 would have been obvious.

2. *Graham v. John Deere Co.*, 383 U.S. 1, 17, 86 S.Ct. 684, 693, 15 L.Ed.2d 545, 148 USPQ 459, 467 (1966).

3. See *Bausch & Lomb, Inc. v. Barnes-Hind Hydrocurve, Inc.*, 796 F.2d 443, 447, 230 USPQ 416, 421 (Fed.Cir.1986); *Loctite Corp. v. Ultraseal, Ltd.*, 781 F.2d 861, 872, 228 USPQ 90, 97-98 (Fed.Cir.1986); *Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163, 225 USPQ 34, 37 (Fed.Cir.1985).

Cite as 807 F.2d 955 (Fed. Cir. 1986)

by the district court: (1) improperly focusing on "a combination of old elements"; (2) ignoring objective evidence of nonobviousness; (3) paying lip service to the presumption of validity; and (4) failing to make sufficient *Graham* findings.

A. *Improperly Focusing on a Combination of Old Elements.*

[1] In assessing the patentability of Custom's device, the district court's Memorandum and Order refers to "a combination of old elements," which "is not necessarily an invention" but is entitled to patent protection if the combination "causes a new and useful result." Though it perceives one of the elements (the protruding pin in the anchoring means) as possibly novel, it states:

A U-clip with a locked pin surely was not itself patentable as an independent invention. Indeed, the plaintiff cancelled claims limited to the anchoring means during reexamination, when they were rejected as obvious. * * *

Such an approach is improper.

The dispositive question is not whether the claimed device is an "invention"; rather, it is whether the invention satisfies the standards of patentability. 35 U.S.C. §§ 100-103. To suggest that Custom's new combination "is not necessarily an invention" or otherwise to require some concept of "inventiveness" or "flash of genius" for patentability would improperly misplace the focus of 35 U.S.C. § 103.⁴

That each element in a claimed invention is old or unpatentable does not determine the nonobviousness of the claimed invention as a whole. "There is no basis in the

law * * * for treating combinations of old elements differently in determining patentability."⁵ As stated in *Stratoflex*:⁶

The reference to a "combination patent" is equally without support in the statute. There is no warrant for judicial classification of patents, whether into "combination" patents and some other unnamed and undefined class or otherwise. Nor is there warrant for differing treatment or consideration of patents based on a judicially devised label. Reference to "combination" patents is, moreover, meaningless. Virtually *all* patents are "combination patents," if by that label one intends to describe patents having claims to inventions formed of a combination of elements. It is difficult to visualize, at least in the mechanical-structural arts, a "non-combination" invention, i.e., an invention consisting of a *single* element. * * * [Emphasis in original.]

Casting an invention as "a combination of old elements" leads improperly to an analysis of the claimed invention by the parts, not by the whole. That is what seems to have happened here. The critical inquiry is whether "there is something in the prior art as a whole *to suggest* the desirability, and thus the obviousness, of making the combination."⁷

A traditional problem with focusing on a patent as a "combination of old elements" is the attendant notion that patentability is undeserving without some "synergistic" or "different" effect. Here, the district court spoke of the need for "a new and useful result." Such tests for patentability have been soundly rejected by this court.⁸

4. Cf. *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1540, 218 USPQ 871, 880 (Fed.Cir.1983) (a trial judge's "reference to 'the heart of invention' was * * * a * * * fall-back to the fruitless search for an inherently amorphous concept that was rendered unnecessary by the statute, 35 U.S.C. The *Graham* analysis here applied properly looked to *patentability*, not to 'invention.'" (Emphasis in original.)).

5. *Fromson v. Advance Offset Plate, Inc.*, 755 F.2d 1549, 1556, 225 USPQ 26, 31 (Fed.Cir.1985).

6. *Stratoflex*, 713 F.2d at 1540, 218 USPQ at 880.

7. *Fromson*, 755 F.2d at 1556, 225 USPQ at 31 (emphasis in original), quoting *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1462, 221 USPQ 481, 488 (Fed.Cir.1984); see also *In re Deminiski*, 796 F.2d 436, 442, 230 USPQ 313, 315-16 (Fed.Cir. 1986).

8. See, e.g., *Gardner v. TEC Sys., Inc.*, 725 F.2d 1338, 1349-50, 220 USPQ 777, 786 (Fed.Cir.) (in banc), cert. denied, 469 U.S. 830, 105 S.Ct. 116, 83 L.Ed.2d 60 (1984); *Stratoflex*, 713 F.2d at 1540, 218 USPQ at 880.

Though synergism is relevant when present, its "absence has no place in evaluating the evidence on obviousness."⁹

The district court's citation to *Dual Manufacturing*¹⁰ together with *Graham v. John Deere*, supports our conclusion that the district court was misled by improper "combination" notions. *Dual Manufacturing* expressly adopts the type of rationale regarding "combination patents" and synergism that this court has expressly rejected and only serves to confuse the real test of obviousness prescribed by the 1952 Patent Act. Though *Republic Industries, Inc. v. Schlage Lock Co.*,¹¹ also cited by the district court, is more in tune with Federal Circuit precedent on combination patents and synergism, the possibility exists that the district court gave more credence to *Dual Manufacturing* because it was decided in banc and subsequent to *Republic Industries*.

B. Ignoring Objective Evidence of Nonobviousness.

[2] The district court found that Custom's "assembly was an improvement, as persuasively evidenced by its adoption by competitors."¹² Though "not a major breakthrough," stated the court, "it was a better mousetrap than those on the market," and "[o]thers have adopted that design, so that it has become a commonly

sold configuration, thus providing support for a contention of commercial success, although plaintiff has had virtually no success in persuading its competition to take licenses." After saying that, however, the district court seemed to ignore the concrete evidence of copying and commercial success. Failure to consider such evidence is clearly error.

[3,4] Under *Graham*, objective evidence of nonobviousness includes commercial success, longfelt but unresolved need, failure of others, and copying.¹³ When present, such objective evidence must be considered.¹⁴ It can be the most probative evidence of nonobviousness in the record, and enables the district court to avert the trap of hindsight.¹⁵ On the other hand, the absence of objective evidence does not preclude a holding of nonobviousness because such evidence is not a requirement for patentability.¹⁶ As stated in *Medtronic, Inc. v. Intermedics, Inc.*,¹⁷ the absence of objective evidence "is a neutral factor."

The district court's failure to consider objective evidence was probably fueled by the two cases it cited together with *Graham*. Both *Dual Manufacturing* and *Republic Industries* mistreat the importance of objective evidence, such as commercial success. They incorrectly state that such

9. *Stratoflex*, 713 F.2d at 1540, 218 USPQ at 880.

10. *Dual Mfg. & Eng'g, Inc. v. Burriss Indus., Inc.*, 619 F.2d 660, 205 USPQ 1157 (7th Cir.) (in banc), cert. denied, 449 U.S. 870, 101 S.Ct. 208, 66 L.Ed.2d 490 (1980).

11. *Republic Indus., Inc. v. Schlage Lock Co.*, 592 F.2d 963, 200 USPQ 769 (7th Cir.1979).

12. Finding that an invention is an "improvement" is not a prerequisite to patentability. It is possible for an invention to be less effective than existing devices but nevertheless meet the statutory criteria for patentability.

13. *Pentec, Inc. v. Graphic Controls Corp.*, 776 F.2d 309, 316-17, 227 USPQ 766, 770-71 (Fed. Cir.1985); see also *Windsurfing Int'l, Inc. v. AMF Incorporated*, 782 F.2d 995, 1000, 228 USPQ 562, 565 (Fed.Cir.), cert. denied, — U.S. —, 106 S.Ct. 3275, 91 L.Ed.2d 565 (1986).

14. *Loctite*, 781 F.2d at 873, 228 USPQ at 98; *Bausch & Lomb*, 796 F.2d at 450, 230 USPQ at 420; see also *Simmons Fastener Corp. v. Illinois Tool Works*, 739 F.2d 1573, 1575, 222 USPQ 744, 746 (Fed.Cir.1984), cert. denied, 471 U.S. 1065, 105 S.Ct. 2138, 85 L.Ed.2d 496 (1985).

15. *Pentec*, 776 F.2d at 315, 227 USPQ at 770; *W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1555, 220 USPQ 303, 314 (Fed.Cir. 1983); *Perkin-Elmer Corp. v. Computervision Corp.*, 732 F.2d 888, 895; 221 USPQ 669, 675 (Fed.Cir.1984).

16. See, e.g., *Leinoff v. Louis Milona & Sons, Inc.*, 726 F.2d 734, 740, 220 USPQ 845, 849 (Fed.Cir. 1984).

17. *Medtronic, Inc. v. Intermedics, Inc.*, 799 F.2d 734, 739, 230 USPQ 641, 643 (Fed.Cir.1986).

objective criteria "without invention will not make patentability."¹⁸

C. *Paying Lip Service to the Presumption of Validity.*

[5] A patent is presumed valid. 35 U.S.C. § 282. Indeed, each claim of a patent is presumed valid independently of the validity of other claims. *Id.* The burden is on the party asserting invalidity to prove the invalidity of each claim (here, claims 1 and 6) with facts supported by clear and convincing evidence.¹⁹

Though the district court stated that the presumption operates to "shift the burden of proof," the Memorandum and Order does not indicate a recognition by the district court that the burden is by clear and convincing evidence. Moreover, the Memorandum and Order occasionally suggests that the district court may have incorrectly placed the burden on the patentee to establish validity. For example, it states: "This court finds unpersuasive plaintiff's contention that Bedford does not anticipate * * *."²⁰

[6] Nor did the district court give any credence to the PTO reexamination proceeding, which upheld the validity of claims 1 and 6 despite the presence of much the same art as was presented before the district court. In *Interconnect Planning Corp. v. Feil*,²¹ this court stated that an examiner's decision on an original or reissue application is "evidence the court must consider in determining whether the party

asserting invalidity has met its statutory burden by clear and convincing evidence," and that, upon reissue, the burden of proving invalidity was "made heavier."²²

D. *Failing To Make Sufficient Graham Findings.*

[7] The amount and specificity of findings needed are determinations to be made on a case-by-case basis.²³ "[W]e must be convinced from the opinion that the district court actually applied *Graham* and must be presented with enough express and necessarily implied findings to know the basis of the trial court's opinion."²⁴ Certainly, when significant legal errors are reflected in the opinion, as here, which themselves shed doubt on the district court's use of *Graham*, the need for findings becomes greater and their absence rises to the level of error.²⁵

In this case, the failure of the district court to make sufficient *Graham* findings further supports our conclusion that *Graham* was not in fact properly applied. The findings were insufficient in at least three regards:

(1) *Scope and Content of Prior Art/Differences Between Prior Art and Claimed Invention*

The Memorandum and Order briefly discusses as prior art United States patents to Bedford, Jr., and to Wootton, a line of

18. *Dual Mfg.*, 619 F.2d at 666, 205 USPQ at 1164; *Republic Indus.*, 592 F.2d at 975, 200 USPQ at 777. In *Stratoflex*, 713 F.2d at 1539, 218 USPQ at 879, this court expressly rejected that notion as circular reasoning.

19. *Loctite*, 781 F.2d at 872, 228 USPQ at 97; *SSIH Equip., S.A. v. USITC*, 718 F.2d 365, 375, 218 USPQ 678, 687 (Fed.Cir.1983).

20. Anticipation is a consideration under 35 U.S.C. § 102, which states in subsection (a) that a person is not entitled to a patent if the invention was "patented or described in a printed publication." A reference "anticipates" when it includes each element of the claimed invention. Section 102 of 35 U.S.C. was not applied by the district court as a ground for invalidating claims 1 and 6.

21. *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1139, 227 USPQ 543, 548 (Fed.Cir.1985) (quoting *Fromson*, 755 F.2d at 1555, 225 USPQ at 31).

22. *Accord American Hoist & Derrick Co. v. Sowa & Sons, Inc.*, 725 F.2d 1350, 1364, 220 USPQ 763, 774 (Fed.Cir.), cert. denied, 469 U.S. 821, 105 S.Ct. 95, 83 L.Ed.2d 41 (1984) (upon reissue in light of prior art before the district court, the "burden of proof of unpatentability has become more difficult to sustain").

23. *Loctite*, 781 F.2d at 873, 228 USPQ at 98.

24. *Id.*

25. *Id.*; *Jones v. Hardy*, 727 F.2d 1524, 1529, 220 USPQ 1021, 1025 (Fed.Cir.1984).

"Au-ve-co" devices, a Tinnerman parts catalogue, and a Rubber Queen assembly. However, the Memorandum and Order does not make clear which reference/devices (references) or combination of references provides the basis for determining obviousness. It is also not clear what teachings are relied on from each reference, and how each reference differs from the claimed invention.

Some differences were found, but improperly considered by the district court. For one, the district court did not find a teaching in any reference of a pin protruding or extending from a clip, but dismissed that difference by stating:

That the Au-ve-co unit and the Wootton patent disclosed an anchoring means in which a bolt threaded into the clip rather than a pin projecting from the clip does not dilute the force of the disclosure. Indeed, the idea taken to DeChant could have ended up in commercial production in that form. * * *

It is unclear what is meant by "does not dilute the force of the disclosure." Clearly, the district court identified a difference between the claimed invention and the prior art—the protruding pin. Before deeming the claimed invention obvious, the district court would have to find some suggestion in the references for using an "outwardly extending pin-like member," as required by the claims.

The district court also stated:

What was brought to him [DeChant, who designed the fastener] was the idea, reduced to practice in a primitive form, of an anchoring means in a splash guard assembly which used a pin attached as part of a clip and projecting through the splash guard. There was no reason, in light of the conception, that the attachment to the clip could not have been by

screwing a bolt into threads [like in the prior art] * * *.

That approach appears inappropriately to perceive an element of the claimed invention (*i.e.*, a pin as part of the clip protruding through the splash guard) broadly as an "idea" or "conception" (screwing a bolt into threads) that the district court viewed as being old in the prior art. Such treatment emasculates a real difference in this case between the claimed invention and the prior art.

(2) *Level of Ordinary Skill*

The *Graham* analysis includes a factual determination of the level of ordinary skill in the art. Without that information, a district court cannot properly assess obviousness because the critical question is whether a claimed invention would have been obvious at the time it was made to one with ordinary skill in the art.²⁶ The important consideration is "the need to adhere to the statute, *i.e.*, to hold that an invention would or would not have been obvious, as a whole, when it was made, to a person of 'ordinary skill in the art'—not to the judge, or to a layman, or to those skilled in remote arts, or to geniuses in the art."²⁷

[8, 9] The person of ordinary skill is a hypothetical person who is presumed to be aware of all the pertinent prior art.²⁸ The actual inventor's skill is not determinative.²⁹ Factors that may be considered in determining level of skill include: type of problems encountered in art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.³⁰ Not all such

26. *Stratoflex*, 713 F.2d at 1538, 218 USPQ at 878-79.

27. *Environmental Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 697, 218 USPQ 865, 868-69 (Fed. Cir.1983), *cert. denied*, 464 U.S. 1043, 104 S.Ct. 709, 79 L.Ed.2d 173 (1984).

28. See, *e.g.*, *Standard Oil Co. v. American Cyanamid Co.*, 774 F.2d 448, 454, 227 USPQ 293, 297 (Fed.Cir.1985).

29. *Id.*

30. *Environmental Designs*, 713 F.2d at 696, 218 USPQ at 868.

factors may be present in every case, and one or more of them may predominate.³¹

In appropriate cases we have noted a district court's failure to make a specific, or correct, finding on level of skill, without the consequence of reversal.³² In those instances, however, it was not shown that the failure to make a finding or an incorrect finding on level of skill influenced the ultimate conclusion under section 103 and, hence, constituted reversible error.

In the present case, we do not reverse or vacate solely because of a failure to make the level of skill finding. We merely consider the district court's failure to make that and other *Graham* findings as evidence that *Graham* was not in fact applied.³³

(3) Objective Evidence of Nonobviousness

It is difficult for us to tell from the district court's discussion of commercial success (see discussion at section B, *supra*) whether there was a finding of commercial success and, if so, whether there was "nexus" between the commercial success and the claimed invention. Such nexus, the existence of which Jeffrey-Allan on appeal disputes, is needed if commercial success is to be considered.³⁴

Conclusion

[10] If, on review of a determination of obviousness, an appellant shows that the district court incorrectly applied the law, we will not reverse (*i.e.*, hold that defendant below failed to prove obviousness) unless appellant also convinces us that a proper application of the law to the facts of

record would change the result.³⁵ Sometimes, however, an appellant will convince us that the law was incorrectly applied, but there are inadequate findings by the district court to enable us to determine independently whether defendant below did or did not prove that the invention would have been obvious. That has happened here because, as explained above, there are inadequate findings in a number of regards. In such circumstances, rather than find material facts ourselves, we must remand to allow the district court to do so. As stated in *Icicle Seafoods, Inc. v. Worthington*:³⁶

If the Court of Appeals believed that the District Court had failed to make findings of fact essential to a proper resolution of the legal question, it should have remanded to the District Court to make those findings. If it was of the view that the findings of the District Court were "clearly erroneous" within the meaning of Rule 52(a), it could have set them aside on that basis. If it believed that the District Court's factual findings were unassailable, but that the proper rule of law was misapplied to those findings, it could have reversed the District Court's judgment. But it should not simply have made factual findings on its own.

Hence, we vacate the judgment of the district court and remand for further proceedings. The district court, based on the record before it and in light of the guidance provided herein, is instructed (1) to make proper findings underlying a determination under section 103, sufficient for us to review its judgment and to assure us that the *Graham* test was in fact applied, and (2) to

case, the district court made no similar notation.

31. *Id.*

32. See, e.g., *Kloster Speedsteel AB v. Crucible, Inc.*, 793 F.2d 1565, 1574, 230 USPQ 81, 86 (Fed.Cir.1986); *Union Carbide Corp. v. American Can Co.*, 724 F.2d 1567, 1573, 220 USPQ 584, 589 (Fed.Cir.1984); *Chore-Time Equip., Inc. v. Cumberland*, 713 F.2d 774, 779, 218 USPQ 673, 676 (Fed.Cir.1983).

33. In *Chore-Time* and *Union Carbide*, this court noted that the prior art itself reflects an appropriate level of skill. See also *Litton Indus.*, 755 F.2d at 163-64, 225 USPQ at 38. In the present

34. *Cable Elec. Prods., Inc. v. Genmark, Inc.*, 770 F.2d 1015, 1026, 226 USPQ 881, 887 (Fed.Cir. 1985).

35. See, e.g., *Carella v. Starlight Archery & Pro-line Co.*, 804 F.2d 135, 140 (1986); *Union Carbide*, 724 F.2d at 1523, 220 USPQ at 589.

36. *Icicle Seafoods, Inc. v. Worthington*, — U.S. —, 106 S.Ct. 1527, 1530, 89 L.Ed.2d 739 (1986).

determine whether defendant below has carried its burden of showing by clear and convincing evidence that the claimed invention would have been obvious under section 103. If the district court deems it appropriate, it may elicit new evidence.

On remand, the district court should also address the other issues presented, *e.g.*, "overclaiming," the section 102(f) defense, and infringement, and should enter judgment accordingly. That way, we need not remand the case should we reverse the district court, in a future appeal, on, *e.g.*, a determination of obviousness. Too often, district courts resolve only one of a number of issues presented and, when reversed on that issue, are forced to retry the remainder of the case. Such retrial is, on balance, an inefficient use of the judicial process. It can, for example, involve duplication of much of the testimony and evidence presented at the first trial.³⁷

VACATED AND REMANDED



BIO-RAD LABORATORIES, INC.,
etc., Appellant,

v.

NICOLET INSTRUMENT
CORPORATION, etc.,
Appellee.

Appeal No. 86-840.

United States Court of Appeals,
Federal Circuit.

Dec. 16, 1986.

Appeal was taken from decision of the United States District Court for the Northern District of California, Lloyd H. Burke, J., finding patent valid and infringed. The Court of Appeals, 739 F.2d 604, vacated

and remanded in part and affirmed in part. On remand, the District Court limited prejudgment interest to nine months, and appeal was taken. The Court of Appeals, Friedman, Circuit Judge, held that: (1) district court's finding in support of its limitation of prejudgment interest that patent owner delayed beginning of trial by six months was clearly erroneous; (2) time it took patent owner to file patent infringement suit did not constitute "undue delay" for purposes of denying owner prejudgment interest; (3) limitation of prejudgment interest to nine months could not be justified as sanction for abuse of discovery process by patent owner; and (4) patent owner's alleged delay in bringing case to trial or alleged discovery improprieties did not warrant using seven percent rate of uncompounded interest as prejudgment interest rate.

Vacated and remanded.

Baldwin, Senior Circuit Judge, filed concurring opinion.

1. Patents ⇐319(4)

District court's finding in support of its limitation of prejudgment interest that patent owner delayed beginning of trial by six months was clearly erroneous, where trial date was set at first status conference, trial commenced only one day after specified date, and there was no indication that, but for behavior of patent owner, trial could or would have begun earlier.

2. Patents ⇐319(4)

Time it took patent owner to file patent infringement suit did not constitute "undue delay" for purposes of denying patent owner prejudgment interest.

See publication Words and Phrases for other judicial constructions and definitions.

3. Patents ⇐319(4)

Dilatory action during discovery, without resultant delay in trial, does not justify limiting period of prejudgment interest.

USPQ at 880.

37. See, *e.g.*, *Stratoflex*, 713 F.2d at 1540-41, 218

Σ

under Rule 12(b)(6) can not stand, even if viewed as a motion for summary judgment.

CONCLUSION

The dismissal of Mr. Hess' cross-complaint on the ground of laches is vacated. The case is remanded for further proceedings.

Taxable costs in favor of Mr. Hess.

VACATED AND REMANDED.



TEXAS INSTRUMENTS
INCORPORATED,
Appellant,

v.

UNITED STATES INTERNATIONAL
TRADE COMMISSION, Appellee,
and

Analog Devices, Inc., and Cypress Semiconductor Corporation, Integrated Device Technology, Inc., LSI Logic Corporation and VLSI Technology, Inc., Intervenor.

CYPRESS SEMICONDUCTOR CORPORATION, Integrated Device Technology, Inc., LSI Logic Corporation and VLSI Technology, Inc., and Analog Devices, Inc., Appellants,

v.

UNITED STATES INTERNATIONAL
TRADE COMMISSION, Appellee,

and

Texas Instruments Incorporated,
Intervenor.

Nos. 92-1168, 92-1218, 92-1282, 92-1288, 92-1319 and 92-1320.

United States Court of Appeals,
Federal Circuit.

March 10, 1993.

Appeals were taken from final determination of the United States International

Trade Commission, finding that patent was valid and that certain imports of plastic encapsulated circuits infringed patent. The Court of Appeals, Clevenger, Circuit Judge, held that: (1) products using same-side gating processes did not literally infringe claims; (2) devices made using opposite-side gating processes infringed patent; (3) patent was not anticipated, obvious or invalid for obvious-type double patenting; and (4) license for patent was transferable, but existence of license did not provide licensee with defense to importing infringing devices in excess of amount permitted by license.

Affirmed.

1. Patents ⇨226.6

Patent infringement analysis is two fold inquiry: threshold question of claim interpretation, followed by determination of whether properly construed claims encompass accused structural process.

2. Patents ⇨314(5), 324.5

Patent claim interpretation is question of law that Court of Appeals reviews de novo.

3. Patents ⇨101(1, 4)

Patent claim interpretation involves review of specifications, prosecution history, the claims and, if necessary, other extrinsic evidence, such as expert testimony.

4. Patents ⇨229

Patent claims for process for encapsulating integrated circuits in plastic claimed a gate specifically located on opposite side of plane from semiconductor device and its electrical connections or on opposite side of conductors from electrical connections, and therefore products using same-side gating processes did not literally infringe claims.

5. Patents ⇨101(1)

"Whereby" and "to preclude" clauses in patent claims, merely describing result of arranging components of claims in man-

ner recited in the claims, added nothing to patentability or substance of claims.

6. Patents ⇨101(1), 235(2)

Patent claim element "a plurality of conductors arranged substantially parallel to one another" required that each conductor be substantially parallel to all other conductors used in the device rather than that accused device contain any two conductors that were substantially parallel to one another, and therefore accused devices meeting the "all parallel limitation" literally infringed claim.

7. Patents ⇨230, 237

Infringement under doctrine of equivalents has been judicially devised to do equity in situations where there is no literal infringement, but liability is nevertheless appropriate to prevent what is in essence a pirating of patentee's intention.

8. Patents ⇨314(5), 324.5

Determining limitations on doctrine of equivalents is question of law reviewed de novo.

9. Patents ⇨168(2.1)

Prosecution history estoppel will not allow patentee to extend range of equivalents accorded device or process to subject matter relinquished during prosecution of patent.

10. Patents ⇨168(1, 2.1)

Prosecution history to which court may look includes entire record of proceedings in Patent and Trademark Office (PTO), including representations made to Examiner that invention is patentable.

11. Patents ⇨168(2.1)

Generally, prosecution history estoppel is based upon showing that applicant intended claim to avoid cited prior art reference.

12. Patents ⇨168(2.1)

Amendment of claim in light of prior art reference is not the *nisine quo non* to establish prosecution history estoppel; unmistakable assertions made by applicant to Patent and Trademark Office (PTO) in support of patentability, whether or not required to secure allowance of claim, may

also operate to preclude patentee from asserting equivalency between limitation of claim and substituted structure or process step.

13. Patents ⇨168(3)

Holder of patent claiming process for encapsulating integrated circuits in plastic was estopped from asserting that same-side gating process was equivalent of opposite-side gating process, where inventors had placed special emphasis on locating gate on opposite side of mold from semiconductor because locating gate on same end of mold did not work.

14. Customs Duties ⇨85(12)

Any error in failure of International Trade Commission to make specific determination as to range of gating equivalents available to patent holder under two claims of patent for process for encapsulating integrated circuits in plastic was harmless, where patent holder was estopped from asserting that same-side gating process was the equivalent of opposite-side gating process in those claims.

15. Patents ⇨230

Products made using opposite-side gating process infringed claim of patent for process for encapsulating integrated circuits in plastic, under doctrine of equivalents.

16. Patents ⇨324.1

Appellants waived right to pursue reverse doctrine of equivalents argument while at International Trade Commission, by failing to alert Commission to possible error in ALJ's initial decision. Tariff Act of 1930, § 337, as amended, 19 U.S.C.A. § 1337.

17. Patents ⇨229

Patent for process for encapsulating integrated circuits in plastic was literally infringed by products made using opposite-side gating processes.

18. Patents ⇨112.1, 112.5

Patent is presumed valid, and party asserting invalidity must overcome this presumption with clear and convincing evi-

dence establishing facts which support conclusion of invalidity.

19. Patents ⇨324.55(1)

Factual determinations of International Trade Commission in patent case are reviewed under substantial evidence standard.

20. Patents ⇨64

Claims of patent could not be anticipated by invention which was not reduced to practice until after patented process was reduced to practice.

21. Patents ⇨16(2, 3), 36.1(1), 314(5)

Obviousness of patent is determined as question of law based on series of factual determinations, including scope and content of prior art, differences between art and claims at issue, level of ordinary skill in the art and any other objective evidence.

22. Patents ⇨324.5

Legal conclusion of nonobviousness of patent is reviewed de novo. 35 U.S.C.A. § 103.

23. Patents ⇨16.14

Patent for process for encapsulating integrated circuits in plastic was not obvious in view of prior art references. 35 U.S.C.A. § 103.

24. Patents ⇨324.5

Double patenting is question of law that Court of Appeals reviews de novo.

25. Patents ⇨120

Claims of patent for process for encapsulating integrated circuits in plastic were not invalid for obviousness-type double patenting; inclusion of transfer molding claim in earlier patent was consonant with restriction requirement examiner imposed on later patent's grandparent application. 35 U.S.C.A. § 121.

26. Customs Duties ⇨22

Patents ⇨212(1), 213

License for patent was transferable, but existence of license did not provide licensee with defense to importing infringing devices in excess of amount permitted by license. Tariff Act of 1930, § 337, as amended, 19 U.S.C.A. § 1337.

27. Customs Duties ⇨85(13)

International Trade Commission's choice of remedy must be affirmed so long as it is not arbitrary, capricious, abuse of discretion or otherwise not in accordance with law.

28. Statutes ⇨188

Statutory interpretation begins with language of statute.

29. Statutes ⇨190

If statute clearly expresses Congress' intent, court must give affect to unambiguously expressed intent of Congress.

30. Customs Duties ⇨22

Membership in domestic industry does not operate to shield importer from purview of statute proscribing importation of articles that infringe valid and enforceable patent. Tariff Act of 1930, §§ 337, 337(a)(1)(B), (a)(2, 3), as amended, 19 U.S.C.A. §§ 1337, 1337(a)(1)(B), (a)(2, 3).

James F. Davis, Howrey & Simon, Washington, DC, argued, for appellant in No. 92-1168 and intervenor in No. 92-1282. With him on the brief, were Cecilia H. Gonzalez, Joseph P. Lavelle, John R. Alison, Diana Stein and Brian T. Foley, Washington, DC. Also on the brief were Jay C. Johnson, Thomas R. Fitzgerald and Patricia L. Ray, Texas Instruments Inc., Dallas, TX.

John M. Calimafde, Hopgood, Calimafde, Kalil, Blaustein & Judlowe, New York City, argued, for appellant, Analog Devices, Inc., in No. 92-1288. With him on the brief, were Marvin N. Gordon and Edward M. Reisner, New York City.

Andrea Casson, Atty., Office of General Counsel, U.S. Intern. Trade Com'n Washington, DC, argued, for appellee. With her on the brief, were Lyn M. Schlitt, Gen. Counsel and James A. Toupin, Asst. Gen. Counsel, Washington, DC.

Paul H. Heller, Kenyon & Kenyon, Washington, DC, argued, for intervenors Cypress Semiconductor Corp., Integrated Device Technology, Inc., LSI Logic Corp. and VLSI Technology, Inc. With him on

the brief, were John C. Altmiller, Philip J. McCabe, Charles W. Calkins and John W. Bateman, Washington, DC. Also on the brief were Michael A. Ladra, Peter N. Detkin and Kenneth B. Wilson, Wilson, Sonsini, Goodrich & Rosati, Palo Alto, CA.

Before NIES, Chief Judge,
CLEVINGER, Circuit Judge, and
KAUFMAN, Senior District Judge.*

CLEVINGER, Circuit Judge.

In these appeals, consolidated for the purpose of decision, Texas Instruments Incorporated (TI), Analog Devices, Incorporated (Analog), Cypress Semiconductor Corporation, Integrated Device Technology, Incorporated, LSI Logic Corporation, and VLSI Technology, Incorporated (VLSI) (all appellants except TI referred to collectively as respondents) appeal the final determination of the United States International Trade Commission (Commission or ITC) in *In the Matter of Certain Plastic Encapsulated Integrated Circuits*, Inv. No. 337-TA-315, USITC Pub. No. 2574 (Nov. 1992). The Commission found that TI's U.S. Patent No. 4,043,027 (the '027 patent) was not invalid and that certain plastic encapsulated circuits imported by the respondents infringed claims 12, 14 and 17 of the '027 patent. The Commission determined that importation of these infringing devices violated section 337 of the Tariff Act of 1930, as amended, (codified at 19 U.S.C. § 1337 (1988)). The Commission, therefore, issued a limited exclusion order and cease and desist orders to each of the five respondents. Respondents challenge the issuance of these orders and TI seeks additional relief. We affirm the Commission's determination.

I. Background

This case is somewhat complicated because of the numerous issues raised by TI and the respondents. Consequently, a brief background serves as a guide to our decision.

* The Honorable Frank A. Kaufman, Senior District Judge of the United States District Court

A. The Commission's Decision

On July 9, 1990, TI filed a complaint with the Commission under section 337 alleging that the respondents had engaged in unfair methods of competition and unfair acts including the importation, sale and marketing in the United States of certain plastic encapsulated circuits produced abroad by a process purportedly covered by claims 1, 12, 14 and 17 of the '027 patent.

After evaluating TI's complaint, the Commission instituted an investigation and assigned it to an administrative law judge (ALJ). Following a hearing, the ALJ issued a 282 page initial decision determining that the respondents had violated section 337 in the unlawful importation or sale of certain plastic encapsulated integrated circuits produced overseas by a process that if practiced in the United States would infringe claims 12 and 14, but not claims 1 and 17, of the '027 patent.

The ALJ determined, *inter alia*, that claim 14 was literally infringed by integrated circuits encapsulated using an "opposite-side gating process." He also determined that claim 12 was infringed by integrated circuits encapsulated using the opposite-side gating process under the doctrine of equivalents. The ALJ determined that none of the claims was literally infringed by integrated circuits encapsulated using a "same-side gating process" and that prosecution history estoppel precluded TI from asserting that integrated circuits encapsulated using the same-side gating process infringed claim 12 under the doctrine of equivalents. With respect to validity, the ALJ determined that the '027 patent was not invalid for obviousness, anticipation, failure to reveal best mode, or obviousness-type double patenting. The ALJ further determined that Analog had acquired a limited license from TI, but that the existence of that license did not provide Analog with a complete defense to the section 337 action.

On December 3, 1991, the Commission decided to review the ALJ's initial decision only on the issues of obviousness, construc-

for the District of Maryland, sitting by designation.

tion of claim 17, infringement of claim 17 and whether claim 17 is practiced by the domestic industry. On that date all unreviewed portions of the ALJ's initial decision were adopted by the Commission. 19 C.F.R. § 210.53(h) (1992). On February 18, 1992, the Commission issued its orders on the basis of a 46 page opinion deciding the issues under review. The Commission again determined that the invention of claims 12, 14, and 17 of the '027 patent would not have been obvious. The Commission construed claim 17 in the same manner as the ALJ, but found that as a factual matter some of Analog's and VLSI's circuits, known as "8-lead" circuits, literally infringed claim 17. Consequently, the Commission issued the limited exclusion order prohibiting all respondents from importing integrated circuits manufactured abroad using the opposite-side gating process covered by claims 12 and 14 of the '027 patent and prohibiting Analog and VLSI from importing circuits manufactured abroad using that process covered by claim 17 of the '027 patent. The Commission also issued a cease and desist order to each respondent prohibiting them from selling their inventory unless the sale is for reexport. The President did not disapprove the determination, so the Commission's actions became final on April 19, 1992. 19 U.S.C. § 1337(j)(4) (1988).

B. The Patented Claims and the Accused Processes

TI's '027 patent claims a process for encapsulating electronic components in plastic through a process called transfer molding. The process claimed in the '027 patent permits a semiconductor to be encapsulated in plastic without damaging the semiconductor or the wires that provide the electrical connection between the semiconductor device and the metal leads which extend outside the molded package. Claims 12, 14 and 17 of the '027 patent are at issue on appeal.

Claim 12

The process for encapsulating a semiconductor device comprising:

electrically connecting each of the electrical terminals of the device to a conductor and mechanically attaching a portion of said device to at least one of the conductors for support;
disposing the conductors generally in a common plane;
disposing the device and a major portion of the means for making electrical connection between the terminals and the conductors generally on one side of the plane;
disposing the device and portions of the conductors in a mold cavity; and
holding the ends of the conductors extending from the mold cavity while injecting a fluid insulating material into the mold cavity on the other side of the plane to subsequently solidify and embed said device, the fluid insulating material being injected into a portion of the cavity remote from the device and the means electrically connecting the terminals of the device to the conductors, whereby the fluid will not directly engage the device and electrical connection means at high velocity, and the conductors will be secured against appreciable displacement by the fluid.

Claim 14

A process of encapsulating a semiconductor device comprising:

providing electrical connections between electrical terminals of the device and a plurality of conductors arranged in a substantially common plane, said device and the thusly provided electrical connections thereto being disposed on one side of said plane,
disposing the device and portions of the conductors in a mold cavity, and
holding the conductors while injecting a fluid insulating material into the mold cavity for subsequently solidifying and embedding said device,
the fluid insulating material being injected into a portion of the cavity on the opposite side of said plane to preclude direct high velocity engagement be-

tween the fluid and the device and the electrical connections thereto.

Claim 17

A process of encapsulating a semiconductor device comprising:

providing electrical connections between electrical terminals of the device and a plurality of conductors arranged substantially parallel to one another, said device and the thusly provided electrical connections thereto being provided on one side of said conductors,

disposing the device and portions of the conductors in a mold cavity, and

holding the conductors while injecting a fluid insulating material into the mold cavity for subsequently solidifying and embedding said device,

the fluid insulating material being injected into a portion of the cavity on the opposite side of said conductors to preclude direct high velocity engagement between the fluid and the device and the electrical connections thereto.

The Commission found that respondents import encapsulated semiconductors produced using two accused processes. No party disputes these findings. Both processes share certain common characteristics. They employ a stamped lead rectangular metal frame as a structure for mounting, assembling and handling the semiconductor devices. The semiconductor die is attached to the lead frame at the "die pad" with heat conducting adhesive. The die pad supports the die, but does not conduct electricity. Terminals on each die are connected to the frame leads with fine whisker wires. The leads generally radiate outward from the die in a "starburst" pattern. The lead frame and attached die pad are placed in a mold cavity with one end of each lead extending out of the cavity. The other end of each lead is cantilevered inside the cavity like a diving board. The upper and lower halves of the die are clamped together holding one end of each conductor. A fluid insulating material is injected into the mold cavity.

The processes differ in the way in which the plastic encapsulating fluid is introduced

into the mold cavity. In the process known as opposite-side gating or "bottom gating," the fluid is introduced through a cavity on the opposite side of the lead frame from the semiconductor die and wires. In the process known as same-side gating or "top gating," the plastic encapsulating fluid is introduced into the mold cavity on the same side of the leads as the semiconductor die and the wires.

C. Issues Appealed

TI and the respondents appeal various portions of the Commission's determination. TI and Analog contend that the Commission incorrectly construed claims 12, 14 and 17. According to TI these claims do not contain a specific gate limitation. TI also argues that claim 17's parallel limitation does not apply to all conductors. Analog contends that the Commission incorrectly determined that the "whereby" or "to preclude" clauses in claims 12, 14 and 17 do not create an additional limitation. With respect to infringement, TI appeals the Commission's findings of noninfringement, asserting that the Commission erred in failing to find that the same-side gating process literally infringes claims 12, 14 and 17 and that all of respondents' devices produced using the opposite-side gating process literally infringe claim 17. TI also argues that, as a matter of law, it established that the same-side gating process infringes claims 12, 14 and 17 under the doctrine of equivalents. Respondents appeal the Commission's infringement determinations arguing that the Commission erred when it determined that the opposite-side gating processes infringe claim 12 under the doctrine of equivalents, that the opposite-side gating processes literally infringe claim 14 and that the 8-lead devices manufactured using an opposite-side gating process literally infringe claim 17. Respondents also appeal the Commission's determinations that the '027 patent is not invalid as obvious, anticipated, or for obviousness-type double patenting. No issue is raised on appeal regarding claim 1. Finally, TI appeals the Commission's determination that Analog is a licensee of TI while

Analog contends that the Commission abused its discretion when it decided to include Analog in its exclusion order and issue Analog a cease and desist order despite the existence of Analog's license. Analog further contends that the Commission could not include Analog in its remedial orders as a matter of law because it is a member of the domestic industry.

II. Infringement

[1] Patent infringement analysis is a two-fold inquiry: a threshold question of claim interpretation followed by a determination of whether the properly construed claims encompass the accused structure or process. *Mannesmann Demag Corp. v. Engineered Metal Prods. Co.*, 793 F.2d 1279, 1282, 230 USPQ 45, 46 (Fed.Cir.1986).

A. Interpretation of the Claims

[2,3] Claim interpretation is a question of law that this court reviews *de novo*. *Key Mfg. Group, Inc. v. Microdot, Inc.*, 925 F.2d 1444, 1448, 17 USPQ2d 1806, 1809 (Fed.Cir.1991). Claim interpretation involves a review of the specification, the prosecution history, the claims (including unasserted as well as asserted claims) and, if necessary, other extrinsic evidence, such as expert testimony. *Hormone Research Found. v. Genentech, Inc.*, 904 F.2d 1558, 1562, 15 USPQ2d 1039, 1043 (Fed.Cir.1990), *cert. dismissed*, — U.S. —, 111 S.Ct. 1434, 113 L.Ed.2d 485 (1991).

1. The gate limitation in claims 12, 14 and 17

[4] Claim 12 requires disposing the conductors generally in a common plane and "injecting a fluid insulating material into the mold cavity on the other side of the plane." Claim 14 similarly requires arranging the conductors in a substantially common plane and injecting a fluid insulating material on the opposite side of the plane. Claim 17 requires injecting the fluid insulating material on the opposite side of the conductors. Relying on the claim language, the specification in conjunction with its drawings, the prosecution history and the testimony of the inventors, the Com-

mission construed claims 12, 14 and 17 to claim a gate specifically located on the other (claim 12) or opposite side (claim 14) of the plane from the semiconductor device and its electrical connections, or, in the case of claim 17, on the opposite side of the conductors from the electrical connections.

TI contends that the Commission's claim construction is erroneous. According to TI claims 12, 14 and 17 only require that the fluid be injected on the opposite side of the plane, not that the gate be located on the opposite side of the plane. Thus, according to TI, injection of fluid insulating material from any point remote from the semiconductor's electrical connections meets the claim language.

TI's contorted construction of the claim language cannot be correct. It cannot seriously be suggested that the location for the injection of the plastic into the mold differs from the location of the gate through which the plastic is injected. As the Commission noted, construing the claims not to refer to a specific gate location as argued by TI would render the disputed claim language mere surplusage. Moreover, the specification, prosecution history, and the testimony of the inventors and experts all support the conclusion that the fluid insulating material is injected through a gate on the other, or opposite side, of the electrical conductors. Indeed, to construe the claims in the manner suggested by TI would read an express limitation out of the claims. This, we will not do because "[c]ourts can neither broaden nor narrow claims to give the patentee something different than what he has set forth." *Autogiro Co. of Am. v. United States*, 384 F.2d 391, 396, 181 Ct.Cl. 55, 155 USPQ 697, 701 (1967).

2. The "whereby" and "to preclude" clauses in claims 12, 14 and 17

[5] Claim 12 concludes with a clause that states "whereby the fluid will not directly engage the device and electrical connection means at high velocity, and the conductors will be secured against appreciable displacement by the fluid." Claims 14 and 17 conclude with the clause "to pre-

clude direct high velocity engagement between the fluid and the device and the electrical connections thereto." The Commission determined that the "whereby" clause in claim 12 and the "to preclude" clauses in claims 14 and 17 only express the necessary results of what is recited in the claims. For this reason, the Commission gave them no weight in its infringement analysis.

Respondents assert that the "whereby/to preclude" clauses of these claims establish specific further limitations to the claims relating to the velocity of the fluid inside the mold and the manner of securing the conductors which must be met in the respondents' opposite-side gating processes in order for those processes to infringe the claims of the '027 patent. We disagree. A "whereby" clause that merely states the result of the limitations in the claim adds nothing to the patentability or substance of the claim. *Israel v. Cresswell*, 166 F.2d 153, 156, 35 CCPA 890, 76 USPQ 594, 597 (1948). The "whereby/to preclude" clauses of claims 12, 14 and 17 merely describe the result of arranging the components of the claims in the manner recited in the claims: the fluid does not directly engage the device and the electrical connection means because the gate through which the fluid enters is remote from them; the conductors are secured against appreciable displacement by the fluid because they are clamped in notches by the upper and lower halves of the mold die. Therefore, the Commission correctly determined that the "whereby/to preclude" clauses do not contain any limitations not inherent to the process found in claims 12, 14 and 17.

3. The "parallel" limitation in claim 17

[6] Claim 17 claims "electrical connections between electrical terminals of the device and a plurality of conductors arranged substantially parallel to one another[.]" Relying on the language of the claims, the specification and its drawings, and witness testimony, the Commission, on review, construed claim 17 to require parallelism among all conductors used, *i.e.*, all of the two or more conductors used must be

arranged parallel to one another over a significant portion of their lengths.

On appeal, TI contends that the claim element "a plurality of conductors arranged substantially parallel to one another" is met so long as the accused device contains any two conductors that are substantially parallel to one another. Essentially, TI reads "plurality" to mean "two" and the terms "to one another" to mean "to each other." Once again, the construction TI proposes must fail because it would read a limitation out of the claim. The claim language does not describe a relationship between a conductor and one other conductor. Rather, the specification, the drawings and the testimony of TI's own witness require that each conductor be substantially parallel to all the other conductors used in the device. Thus, the Commission correctly determined that all the conductors must be substantially parallel to one another.

B. Application of Claims to Processes

Having determined that the Commission correctly construed the claims, we next review whether the Commission also correctly decided the myriad of infringement allegations. The question of infringement, either literal or by equivalents, is a factual one. *SRI Int'l v. Matsushita Elec. Corp. of Am.*, 775 F.2d 1107, 1125, 227 USPQ 577, 589 (Fed.Cir.1985) (in banc). We review the Commission's factual findings under the substantial evidence standard. 19 U.S.C. § 1337(c) (1988) (persons adversely affected by certain final Commission determinations may appeal to the Federal Circuit for review in accordance with chapter 7 of Title 5 of the U.S.Code); *SSIH Equip., S.A. v. United States Int'l Trade Comm'n*, 718 F.2d 365, 371-72, 218 USPQ 678, 684 (Fed.Cir.1983).

1. Same-side processes

The Commission determined that semiconductor products made using same-side gating processes imported by respondents did not literally infringe claims 12, 14 and 17 because they did not meet the opposite-side gate limitation found in these claims.

The Commission also determined that prosecution history estoppel precluded TI from expanding the opposite-side gate limitation in claim 12 to include same-side gating. Thus, same-side gating products could not infringe claim 12 under the doctrine of equivalents.

a. *Literal infringement*

On appeal, TI contends that the Commission's determination that products made using same-side processes do not literally infringe claims 12, 14 and 17 should be reversed. Having held that the Commission did not err in construing the claims to contain a specific gate limitation, we also affirm the Commission's determination that products made using the same-side gating process do not literally infringe claims 12, 14 and 17. The Commission's finding that these products are not produced using an opposite-side gating process is based on substantial evidence.

b. *Doctrine of equivalents*

[7-9] Infringement under the doctrine of equivalents has been "judicially devised to do equity" in situations where there is no literal infringement, but liability is nevertheless appropriate to prevent what is in essence a pirating of the patentee's invention. *Loctite Corp. v. Ultraseal, Ltd.*, 781 F.2d 861, 870, 228 USPQ 90, 96 (Fed.Cir. 1985) (citing *Hughes Aircraft Co. v. United States*, 717 F.2d 1351, 1361, 219 USPQ 473, 480 (Fed.Cir.1983)). Prosecution history estoppel is a policy oriented limitation to the range of equivalents available to the patentee, a limitation that we review as a question of law. Prosecution history estoppel will not allow the patentee to extend the range of equivalents accorded the device or process to subject matter relinquished during prosecution of the patent. *Id.*, 781 F.2d at 870, 228 USPQ at 96 (citing *Perkin-Elmer Corp. v. Computervision Corp.*, 732 F.2d 888, 900, 221 USPQ 669, 678 (Fed.Cir.), *cert. denied*, 469 U.S. 857, 105 S.Ct. 187, 83 L.Ed.2d 120 (1984)).

The Commission found that the inventors had based their argument for claim 12's patentability on the opposite-side gating

limitation it contained. Having done so while prosecuting the '027 patent, TI was estopped from asserting that the same-side gating process used by respondents is the equivalent of the opposite-side gating specified in claim 12. The Commission therefore concluded that the respondents' same-side gated processes could not be found to infringe claim 12 of the '027 patent under the doctrine of equivalents.

Determining the limitations on the doctrine of equivalents is a question of law which we review *de novo*. *Id.*, 781 F.2d at 870, 228 USPQ at 96. On appeal, TI argues that no prosecution history estoppel exists because there is no basis in the file history to conclude that TI gave up coverage of same-side gated processes. More particularly, TI asserts that with no citation of a prior art reference disclosing the same-sided process the inventors cannot be deemed to have disclaimed or disavowed same-side gating.

[10] We must decide whether the Commission erred as a matter of law in determining that the prosecution history indicates that the '027 patent applicants disclaimed or disavowed same-side gating. The prosecution history to which we may look includes "[t]he entire record of proceedings in the Patent and Trademark Office, including representations made to the Examiner that the invention is patentable...." *Jonsson v. Stanley Works*, 903 F.2d 812, 817, 14 USPQ2d 1863, 1868 (Fed. Cir.1990) (citing *Standard Oil Co. v. American Cyanamid Co.*, 774 F.2d 448, 452, 227 USPQ 293, 296 (Fed.Cir.1985)).

The '027 patent issued on August 23, 1977. Its history traces to December 16, 1963, when inventors Robert O. Birchler and E.W. Williams filed the grandparent application, Application No. 331,006, entitled "Process for Encapsulating Electronic Components in Plastic." On October 17, 1968, the inventors filed Divisional Application No. 768,311, the '027 patent's parent application, which was followed by Continuation Application No. 384,768 on July 30, 1973. That continuation application matured into the '027 patent. It is the interaction between the inventors and the patent

examiner during the prosecution of the '006 application that is of interest in this appeal.

[11, 12] As a general proposition, prosecution history estoppel is based upon a showing that an applicant amended a claim to avoid a cited prior art reference. *Hughes Aircraft*, 717 F.2d at 1362, 219 USPQ at 481. TI correctly states that none of the references cited by the examiner disclosed same-side gating and the inventors never amended claim 12 to add the opposite-side gating limitation to distinguish and overcome a prior art reference. Amendment of a claim in light of a prior art reference, however, is not the *sine qua non* to establish prosecution history estoppel. Unmistakable assertions made by the applicant to the Patent and Trademark Office (PTO) in support of patentability, whether or not required to secure allowance of the claim, also may operate to preclude the patentee from asserting equivalency between a limitation of the claim and a substituted structure or process step. *Hormone Research*, 904 F.2d at 1567, 15 USPQ2d at 1046; *Kinzenbaw v. Deere & Co.*, 741 F.2d 383, 389, 222 USPQ 929, 933 (Fed.Cir.1984), *cert. denied*, 470 U.S. 1004, 105 S.Ct. 1357, 84 L.Ed.2d 379 (1985). Application of this test requires, in each case, examination of the prosecution history taken as a whole.

[13] The prosecution history of the '027 patent shows that the inventors placed special emphasis on locating the gate on the opposite side of the mold from the semiconductor because locating the gate on the same-side of the mold did not work. An invention disclosure form placed by the inventors in the PTO file reads:

In order to transfer mold successfully, it was found that the gate placement was critical. The first experiment placed the gate in the top of the unit, which is the conventional location for end gating.... The results were most unsatisfactory with the emitter and base lead being broken as the cavity filled. It was found during the same experiment that better results were obtained when the unit was in the top half of the mold so it did not

see the plastic as it is initially introduced to the cavity.

Consequently, the disclosure form and the inventor's notebook, also of record, assert that one of the four important features of the invention was that the "gate is in the bottom half [opposite-side] of the mold, and the device in the top." The importance of opposite-side gating was also emphasized in the figure attached to the invention disclosure form, a drawing that eventually became Figure 5 of the '027 patent. The drawing shows the plastic insulating material, after injection in the side opposite from the semiconductor, flowing into the bottom of the mold cavity and then flowing up around the device into the top half of the mold cavity. *In toto*, the invention disclosure form explains that same-side gating was known in the molding art, and that the inventors were certain that same-side gating could not achieve their desired invention. The inventors' own assumptions provided the motivation for purposeful exclusion of same-side gating from claim 12. As far as they were concerned same-side gating in transfer molding was an obvious but unworkable limitation. The inventors first tried the "conventional" same-side gate location but discovered that it was opposite-side gating that produced usable encapsulated products. Thus, when the examiner rejected claim 12's predecessor claims in the '006 application, claims 21 and 22, as obvious in view of three prior art references, the inventors argued that it was the organization of the electrical connections in a common plane, with the conductor wires being located on one side of the plane and the plastic fluid being injected into the mold on the opposite side of the plane that made the claim patentable:

none of these references alone or in combination in any way show or suggest the step of injecting the fluid insulating material into a mold cavity on an opposite side of the common plane defined by the conductor wires from the side on which the device and a major portion of the means making the electrical connection between the device and the conductor wires are disposed.

By expressly stating that claim 12 was patentable because of the opposite-side gating limitation, particularly in light of their previous admission that same-side gating was known in the art, the inventors unmistakably excluded the same-side gating as an equivalent. Having represented that same-side gating does not work, and having distinguished cited prior art as not teaching the functional opposite-side gated process, TI cannot foreclose reliance upon its unambiguous surrender of subject matter. *See Standard Oil Co.*, 774 F.2d at 452-53, 227 USPQ at 296 (metallic copper represented in specification as "ineffective," and "outside [the] claims" in response to examiner's rejection). Such foreclosure is impermissible because "other players in the marketplace are entitled to rely on the record made in the Patent Office in determining the meaning and scope of the patent." *Lemelson v. General Mills, Inc.*, 968 F.2d 1202, 1208, 23 USPQ2d 1284, 1289 (Fed.Cir.1992). For these reasons, the Commission did not err in concluding that TI is estopped from asserting that a same-side gating process is the equivalent of the opposite-side gating process in claim 12.

[14] TI draws our attention to the fact that the Commission made no specific determination as to the range of gating equivalents available to TI under claims 14 and 17 of the '027 patent. If the Commission's silence on that point is error, the error necessarily is harmless because the prosecution history estoppel we hold proven on claim 12 is equally applicable to claims 14 and 17.

2. Opposite-side processes

The Commission determined that semiconductor products made using opposite-side gating processes imported by respondents infringed claim 12 under the doctrine of equivalents, infringed claim 14 literally, and that Analog's and VLSI's 8-lead semiconductor products made using opposite-side gating processes literally infringed claim 17. Respondents challenge all three of these infringement determinations on appeal. TI challenges the claim 17 in-

fringement finding asserting that it should cover more types of semiconductors.

a. *Claim 12 and doctrine of equivalents infringement by opposite-side processes*

In determining that the respondents' products made using an opposite-side gating process infringe claim 12 of the '027 patent under the doctrine of equivalents, the Commission found that the only limitation of claim 12 not literally found in the respondents' opposite-side encapsulating processes is the attachment of the semiconductor device to a conductor for support. The Commission found that the die pad in respondents' products is the equivalent of the supporting conductor, because it performs exactly the same function in exactly the same way to achieve exactly the same result. Because the accused processes merely divided the two functions of the supporting conductor (support of the die and electrical connection thereof to an external circuit) between two separate components of their processes, the processes infringed the claim.

On appeal, respondents contend that the Commission's determination that devices made using opposite-side gating processes infringe claim 12 under the doctrine of equivalents is not based on substantial evidence because (1) the accused processes do not meet the whereby limitation; (2) the accused processes do not have an equivalent to the support conductor; and (3) the die pad in the accused processes does not meet the common plane limitation. Further, infringement is precluded by the reverse doctrine of equivalents.

[15] Because we agree with the Commission that the whereby clause in claim 12 is not an additional limitation, we reject the contention that infringement cannot be found provided that all limitations of the claim are present in the accused process. Substantial evidence supports the Commission's determination that the products made using opposite-side gating processes infringe claim 12 under the doctrine of equivalents: they contain the equivalent of the claimed support conductor and they

meet the common plane limitation. Claim 12 requires, *inter alia*, that the device be mechanically connected to a conductor for support and electrically connected to the same or another conductor to conduct electricity. Further, claim 12's conductors are to be generally disposed in a common plane. The die pad in respondents' process is the functional equivalent of claim 12's supporting conductor limitation: it supports the semiconductor, as a mechanical attachment, in order to hold the semiconductor in place. Respondents' die pad need not, and does not, function as a conductor; it does not become a conductor simply because it assumes the support function. Therefore, the die pad need not meet the common plane limitation of claim 12. That limitation is met by respondents' conductors which are disposed in a common plane.

[16] Furthermore, we will not consider Analog's and VLSI's reverse doctrine of equivalents argument in this appeal because they waived the right to pursue this argument while at the Commission. Analog, arguing the infringement issues for all respondents, made a reverse doctrine of equivalents argument at the Commission in its posthearing brief submitted to the ALJ. The ALJ made no specific findings on this defense in his initial decision, but Analog did not raise this "defect" in the ALJ's decision in its petition for review submitted to the Commission. Analog contends that it raised the issue in its petition for review when it asserted that its devices did not literally infringe claim 17. We disagree. One does not make a reverse doctrine of equivalents argument simply by mounting a defense to literal or doctrine of equivalents infringement. *See Rolls-Royce Ltd. v. GTE Valeron Corp.*, 800 F.2d 1101, 1108, 231 USPQ 185, 190 (Fed.Cir.1986). The Commission's rules governing section 337 investigations deem abandoned any issue not raised in the petition for review. 19 C.F.R. § 210.54(a)(2) (1992). Respondents having failed to alert the Commission to a possible error in the ALJ's initial decision, this court will not now examine the issue. *Allied Corp. v. United States Int'l Trade Comm'n*, 850 F.2d 1573, 1580, 7 USPQ2d 1303, 1308 (Fed.Cir.1988), *cert. de-*

nied, 488 U.S. 1008, 109 S.Ct. 791, 102 L.Ed.2d 782 (1988).

b. *Claim 14 and literal infringement by opposite-side processes*

[17] The Commission determined that claim 14 is literally infringed by products made using opposite-side gating processes having found that respondents' processes meet all the limitations of claim 14.

Respondents contend that the Commission's claim 14 infringement determination is not based on substantial evidence because (1) the accused processes do not meet the "to preclude" clause limitation; (2) the die pad in the accused processes does not meet the common plane limitation; and (3) literal infringement is precluded by the reverse doctrine of equivalents.

None of these assertions merits much extended discussion. As explained above, the "to preclude" clause is not an additional limitation that the accused processes must meet. Further, claim 14, unlike claim 12, does not have a supporting conductor limitation so the supporting die pad in the accused processes need not be aligned with the conductors in a generally common plane in order to literally infringe claim 14. There is substantial evidence to support the finding that the conductors in the respondents' devices meet the common plane limitation. Finally, as explained above, respondents have waived their reverse doctrine of equivalents argument.

c. *Claim 17 and 8-lead opposite-side devices*

TI, Analog and VLSI appeal the Commission's determination that 8-lead products made using opposite-side processes literally infringe claim 17. The Commission determined that such products literally infringed claim 17 because all of their conductors are "arranged parallel over a significant portion of the conductors' length."

TI contends that all products made using opposite-side processes literally infringe claim 17 provided the claim is construed to require only that two conductors be substantially parallel to each another. Since

we have held that the Commission did not err in construing the claim to require that all the conductors must be substantially parallel to each other, TI's challenge to the correctness of this infringement determination must fail.

Analog and VLSI contend that the Commission's determination that their 8-lead devices (produced using opposite-side gating processes) literally infringe claim 17 is not based on substantial evidence because (1) the accused processes do not meet the "to preclude" limitation; (2) the presence of a die pad in such processes means that they fail to meet the "all parallel conductor" limitation; and (3) literal infringement is precluded by the reverse doctrine of equivalents.

Analog's and VLSI's arguments are meritless. As explained above, the "to preclude" clause is not an additional limitation that the accused processes must meet. Further, claim 17 does not contain the support limitation found in claim 12. Therefore, there is no need to consider whether the die pad meets the "all parallel" limitation, a limitation which is addressed to the conductors not to the die pad. Moreover, there is substantial evidence to support the Commission's determination that the conductors on the 8-lead devices meet the "all parallel limitation" and therefore literally infringe claim 17. Finally, as explained above, respondents have waived their reverse doctrine of equivalents argument.

III. Validity

[18] A patent is presumed valid and the party asserting invalidity must overcome this presumption by clear and convincing evidence establishing facts which support the conclusion of invalidity. *Intel Corp. v. United States Int'l Trade Comm'n*, 946 F.2d 821, 834, 20 USPQ2d 1161, 1172 (Fed. Cir.1991). Respondents challenge the Commission's determination that the '027 patent is not invalid on three grounds, that the patent is obvious under section 103, that it is anticipated under section 102, and that it is invalid for obviousness-type double patenting over U.S. Patent No. 3,716,764 (the '764 patent). Respondents do not con-

tend, as they did before the Commission, that the '027 patent is invalid for failure to reveal the best mode.

A. Anticipation

[19] A patent may be invalid as anticipated due to the prior conception and reduction to practice by another of the patentee's invention. 35 U.S.C. § 102(g) (1988). Anticipation is a question of fact. *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1379, 231 USPQ 81, 90 (Fed. Cir.1986), *cert. denied*, 480 U.S. 947, 107 S.Ct. 1606, 94 L.Ed.2d 792 (1987). We review the Commission's factual determinations under the substantial evidence standard. *SSIH*, 718 F.2d at 371-72, 218 USPQ at 684.

[20] Respondents assert on appeal, as they did before the Commission, that work performed by Mr. Robert Helda and Mr. Milan Lincoln at Motorola anticipated the '027 patent. The Commission determined that the Helda-Lincoln invention was not reduced to practice until November 6, 1963, after Mr. Birchler and Mr. Williams reduced the '027 process to practice in late September 1963 at Texas Instruments. Therefore, the Commission found that the Helda-Lincoln invention is not prior art and cannot anticipate the '027 patent.

On appeal respondents do not argue that the Helda-Lincoln reduction to practice date of November 6, 1963, is erroneous. Instead, they argue that the reduction to practice date of the '027 process in late September 1963 is erroneous because corroborating evidence only supports a reduction to practice date of December 12, 1963, the filing date of the '027 patent. If the '027 patent's process were reduced to practice on that date, then the Helda-Lincoln invention prior art would anticipate the '027 patent.

Respondents' arguments are to no avail. Reviewing this issue *de novo*, *DSL Dynamic Sciences v. Union Switch & Signal, Inc.*, 928 F.2d 1122, 1125, 18 USPQ2d 1152, 1154 (Fed.Cir.1991), we conclude that the '027 patent's reduction to practice date of late September is corroborated by the evidence and is not erroneous. The claims

of the '027 patent therefore cannot be anticipated by the Helda-Lincoln invention.

B. Obviousness

[21, 22] A patent is invalid if the differences between the subject matter patented and the prior art are such that the patented subject matter as a whole would have been obvious at the time of invention to a person having ordinary skill in the art. 35 U.S.C. § 103 (1988). Obviousness is determined as a question of law based on a series of factual determinations, including (1) the scope and content of the prior art, (2) the differences between the art and the claims at issue, (3) the level of ordinary skill in the art and (4) any other objective evidence. *Graham v. John Deere Co.*, 383 U.S. 1, 17, 86 S.Ct. 684, 693, 15 L.Ed.2d 545, 148 USPQ 459, 467 (1966); see, e.g., *Allen Archery, Inc. v. Browning Mfg. Co.*, 819 F.2d 1087, 1092, 2 USPQ2d 1490, 1493 (Fed. Cir.1987). We review the Commission's factual determinations under the substantial evidence standard. *SSIH*, 718 F.2d at 371-72, 218 USPQ at 684. We then review the legal conclusion of nonobviousness *de novo*. *Intel Corp.*, 946 F.2d at 834, 20 USPQ2d at 1173.

[23] The Commission having correctly found that the Helda-Lincoln invention was not reduced to practice before the '027 process, there is no dispute about the scope and content of the prior art. The Commission found that the prior art includes: (1) the Doyle process patent; (2) the Lanzl patent; (3) the Sylvania transistor as described in the Carruth and Sussman article; (4) the Zecher article; and (5) the Burns patent.

The Commission, reviewing the ALJ's initial decision, found the '027 patent nonobvious because it found nothing in the Sylvania, Lanzl, Burns, or Zecher references to suggest making the leads in the Doyle reference planar while injecting molten plastic from the opposite side of the plane to produce an inexpensive semiconductor. The Commission further found that a secondary indicia of nonobviousness, long-felt need, supported its determination that the invention of the '027 patent was nonobvious.

Respondents assert that the Doyle reference teaches opposite-side gating which renders the '027 patent obvious because all the other features of the patent are included in the prior art. Further, respondents argue that there can be no long-felt need when the period between the date of the most pertinent prior art references (here Doyle and Sylvania) and the claimed invention is very short.

There is substantial evidence in the record to support the Commission's finding that the Doyle reference does not teach opposite-side gating. Moreover, we agree with the Commission that the references in combination do not suggest the invention as a whole claimed in the '027 patent. Absent such suggestion to combine the references, respondents can do no more than piece the invention together using the patented invention as a template. Such hindsight reasoning is impermissible. *In re Fine*, 837 F.2d 1071, 1075, 5 USPQ2d 1596, 1600 (Fed.Cir.1988). Thus, the Commission's conclusion that the '027 patent would not have been obvious in view of these prior art references is not erroneous.

With respect to long-felt need respondents incorrectly argue that long-felt need is analyzed only as of the date of the "most pertinent" prior art references. Rather, long-felt need is analyzed as of the date of an articulated identified problem and evidence of efforts to solve that problem. The Commission found that semiconductor manufacturers began searching for a means to mass produce inexpensive transistors in the early 1960s. The industry aggressively embraced the technique of packaging components in plastic by transfer molding between 1957 and 1963. Early attempts encountered problems, such as damaging the devices when using high velocity molding compounds and multiple inventors were working on the problem. For these reasons, there is substantial evidence to support the Commission's finding of long-felt need for the process claimed in the '027 patent.

C. Obviousness-type double patenting

Twenty months after inventors Birchler and Williams filed the '006 patent applica-

tion, the examiner determined that the amended claims of the '006 application described three distinct inventions. He restricted each claim to one of three groups. The group I claims were drawn to a semiconductor device, the group II claims to an injection molding process for semiconductor devices, and the group III claims to "a lead frame for semiconductor devices and a method for securing semiconductor crystals to that frame, i.e. an intermediate product for use in producing the final semiconductor device." The group I claims resulted in patent number 3,439,238. The group III claims eventually issued as the '764 patent. The group II claims eventually issued as the '027 patent. •

The Commission determined that claims 12, 14 and 17 of the '027 patent were not invalid for obviousness-type double patenting. When the examiner restricted the claims to three groups, he included in group III a claim associated with transfer molding, although he described that group not to include transfer molding. Nonetheless, the Commission concluded that the actual restriction groupings, not the written descriptions thereof, control for purposes of ascertaining if subsequent amendments to original claims are consonant with the substantive restrictions drawn by the examiner.

On appeal, respondents again argue that including the transfer molding claim (claim 17) in the '764 patent failed to maintain consonance with the restriction requirement the examiner imposed on the '027 patent's grandparent application. Having failed to maintain consonance with the restriction requirement, claims 16 and 17 of the '764 patent become prior art which, when combined with the Doyle reference render claims 12, 14 and 17 of the '027 patent invalid.

[24, 25] Double patenting is a question of law that this court reviews *de novo*. *General Foods Corp. v. Studiengesellschaft Kohle mbH*, 972 F.2d 1272, 1277, 23 USPQ2d 1839, 1843 (Fed.Cir.1992). A patentee may not remove a patent from consideration as a prior art reference pursuant to 35 U.S.C. section 121 (1988) where the

principle of consonance is violated. *Symbol Technologies, Inc. v. Opticon, Inc.*, 935 F.2d 1569, 1579, 19 USPQ2d 1241, 1249 (Fed.Cir.1991). In order for consonance to exist, "the line of demarcation between the 'independent and distinct inventions' that prompted the restriction requirement" must be maintained. *Gerber Garment Technology, Inc. v. Lectra Sys., Inc.*, 916 F.2d 683, 688, 16 USPQ2d 1436, 1440 (Fed. Cir.1990). We agree with the Commission's determination that the post-restriction addition of claim 17 to the '764 patent is consonant with the grouping restriction actually imposed by the examiner. Consequently, the protection of section 121 applies and the claims of the later issued '027 patent are protected from an allegation of double patenting. Moreover, even if there were no consonance due to a breach of the restriction requirement, respondents' contentions on the ultimate obviousness-type double patenting inquiry would fail. Claims 12, 14 and 17 of the '027 patent are patentably distinct from claim 17 of the '764 patent. *See General Foods*, 972 F.2d at 1277, 23 USPQ2d at 1843; *Symbol*, 935 F.2d at 1581, 19 USPQ2d at 1249. These claims are not so very much alike as to render claims 12, 14 and 17 of the '027 patent obvious in view of claims 16 and 17 of the '764 patent. *See Gerber*, 916 F.2d at 686, 16 USPQ2d at 1438. Claims 12, 14, and 17 of the '027 patent disclose injecting the fluid insulating material from a gate on the opposite side of the conductors. Opposite-side injection of the fluid is not disclosed in either claim 16 or 17 of the '764 patent, nor would it be obvious in light of claims 16 or 17 of the '764 patent.

IV. Issues Particular to Analog

On August 8, 1990, after the Commission instituted its investigation, Analog acquired the stock of a corporation that had entered into a cross-license agreement with TI in 1974 for several patents including the '027 patent. The license agreement provides that it is to be construed in accordance with Texas law. On November 3, 1990, Analog and that company formally merged. The Commission determined that Analog acquired this license because the

agreement between TI and its licensee did not require consent from TI for the licensee to transfer to a third party acquiring substantially all the assets of the licensee.

[26] On appeal, TI contends that the Commission's construction of the license's transferability is legally erroneous and unreasonable. Because we agree with the Commission that the contract is not ambiguous, we review this question of contract interpretation *de novo*. *Snug Harbor, Ltd. v. Zurich Ins.*, 968 F.2d 538, 541-42 (5th Cir.1992). Because we do not find the Commission's construction of the contract to be erroneous, we affirm the Commission's determination that Analog acquired a license through the merger, a license for sales not to exceed the annual sales of licensed products being made by the original licensee at the time Analog acquired the license.

Analog is not content with the decision that it acquired a valid license from TI. Analog further argues that the Commission's failure to dismiss Analog from the investigation and its decision to issue a cease and desist order against it is erroneous because as a licensee Analog cannot be committing an unfair trade practice.

The Commission determined that Analog became licensed after the institution of its investigation, a considerable period after a violation of section 337 was alleged to have begun. The Commission found that Analog (along with the other respondents) violated section 337 by importing and selling after importation the accused devices. The Commission then issued a cease and desist order and a limited exclusion order to Analog. These orders, however, do not apply to products licensed by TI. Analog's sales to the extent of the annual sales of the original TI licensee are not subject to the remedy fashioned by the Commission.

[27] We must affirm the Commission's choice of remedy so long as it is not arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law. In other words, "if the Commission has considered the relevant factors and not made a clear error of judgment, we affirm its choice of remedy." *Hyundai Elecs. Indus.*

Co. v. United States Int'l Trade Comm'n, 899 F.2d 1204, 1209, 14 USPQ2d 1396, 1400 (Fed.Cir.1990). Clearly, Analog's license with TI is a limited license. There is no guarantee that Analog will limit its importation of otherwise infringing devices to the amount permitted by its license. The Commission's decision to fashion a remedy that permits Analog fully to enjoy its license and prevents Analog from violating section 337 can hardly be deemed a clear error of judgment.

Analog further contends that a member of the domestic industry is immune to remedial orders under section 337, and that the Commission therefore erred as a matter of law in subjecting it, as a member of the affected domestic industry, to section 337 orders. We must determine whether the Commission correctly construed the statute in rejecting Analog's novel contention.

[28, 29] Statutory interpretation begins with the language of the statute. *Mallard v. United States Dist. Court for S. Dist. of Iowa*, 490 U.S. 296, 300-01, 109 S.Ct. 1814, 1817-18, 104 L.Ed.2d 318 (1989). If the statute clearly expresses Congress's intent, we must give effect to the "unambiguously expressed intent of Congress." *Chevron U.S.A. Inc. v. Natural Resources Defense Council, Inc.*, 467 U.S. 837, 843, 104 S.Ct. 2778, 2781, 81 L.Ed.2d 694 (1984). If we determine that Congress has not directly addressed the issue, then we must determine whether the Commission's construction of the statute is permissible. *Id.*

Section 337 renders unlawful

[t]he importation into the United States, the sale for importation, or the sale within the United States after importation by the owner, importer, or consignee, of articles that—

- (i) infringe a valid and enforceable United States patent . . . , or
- (ii) are made, produced, processed, or mined under, or by means of, a process covered by the claims of a valid and enforceable United States patent[.]

provided that a domestic industry exists in the United States. 19 U.S.C.

§§ 1337(a)(1)(B), (a)(2) (1988). A domestic industry exists in the United States if there is, with respect to the articles protected by the patent

(A) significant investment in plant and equipment;

(B) significant employment of labor or capital; or

(C) substantial investment in its exploitation, including engineering, research and development, or licensing.

19 U.S.C. § 1337(a)(3) (1988).

[30] The plain language of subsection (a)(1)(B) prohibits the importation of articles found to infringe a valid and enforceable United States patent by *any* owner, importer or consignee. There is no suggestion in the statutory language that only owners, importers, or consignees *not* in the domestic industry are subject to the remedial powers bestowed on the Commission by statute. This language is clear and its meaning is unambiguous. Membership in the domestic industry does not operate to shield an importer such as Analog from the purview of section 337. Our duty, as was the Commission's, is to enforce the statute according to its terms.

Moreover, Analog's construction of the statute, if correct, would enable members of the domestic industry to engage in conduct that would otherwise be unlawful under section 337. When Congress amended section 337 of the Tariff Act of 1930 in 1988 to provide the definition of domestic industry now found in subsection (a)(3), it stated that its purpose was "to make [section 337] a more effective remedy for the protection of United States intellectual property rights." Omnibus Trade and Competitiveness Act of 1988, Pub.L. No. 100-418, § 1341(b), 1988 U.S.C.C.A.N. (102 Stat.) 1107, 1212 (codified at 19 U.S.C. § 1337 note). Analog urges us to hold that some members of the domestic industry may commit unfair trade acts against other law-abiding members of the domestic industry with impunity. Such a result would make section 337 a less, not more, effective remedy. We necessarily decline to rewrite the statute. Congress may, if it wishes, revise section 337 to provide the immunity

Analog seeks. Until such time, the statutory domestic industry requirement will remain a jurisdictional prerequisite to Commission action under section 337, not, as Analog desires, a congressional pardon for unlawful conduct.

V. Conclusion

For the preceding reasons, the decision of the United States International Trade Commission to remedy a violation of section 337, predicated on its determination that the '027 patent is not invalid and is infringed by certain products made using an opposite-side gating encapsulation process is

AFFIRMED.



In re VAN GEUNS.

No. 91-1088.

United States Court of Appeals,
Federal Circuit.

March 10, 1993.

Senior party appealed from a decision of the Patent and Trademark Office Board of Patent Appeals and Interferences in interference No. 101,855, that claims designated as corresponding to the interference count were unpatentable for obviousness. The Court of Appeals, Archer, Circuit Judge, held that: (1) the subject matter of the interference count reciting a superconducting magnet assembly with a "uniform magnetic field" would have been obvious, in light of an existing Japanese reference that disclosed a magnet assembly with a substantially uniform magnetic field, to one of ordinary skill in the art of Nuclear Magnetic Resonance (NMR) and Magnetic Resonance Imaging (MRI), even if the claim had been limited to NMR and MRI apparatus, and (2) the senior party did not

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that relates to the source of all such goods. What is wrong with the advertising evidence is that it fails to give any indication of the proportion of expenses allocated to promoting pink as an indication of source, a failure which can only result in guesswork by the court. Since Owens-Corning failed to carry its burden under the most minimal standard of proof it is difficult to understand how the Board imposed an improperly heavy burden.

The Board's evaluation of the evidence leading to its finding that Owens-Corning failed to establish that pink insulation is associated with a single source does not evoke a "definite and firm conviction that a mistake has been made." *United States v. United States Gypsum Co.*, 333 U.S. 364, 365, 68 S.Ct. 525, 92 L.Ed. 746 (1948). Accordingly, its finding cannot be regarded as clearly erroneous and must be affirmed.



INTERCONNECT PLANNING CORPORATION, Plaintiff-Appellant,

v.

**Thomas E. FEIL, Robert O. Carpenter, V
Band Systems, Inc., and Turret Equip-
ment Corp.,* Defendants-Appellees.**

Appeal Nos. 84-1467, 85-565.

**United States Court of Appeals,
Federal Circuit.**

Oct. 9, 1985.

In a patent infringement suit, the United States District Court for the District of New York, 587 F.Supp. 1495, Kevin Thomas Duffy, J., granted summary judgment on defendants' counterclaim alleging that plaintiff's reissue patent no. 31,144 for a

multistation telephone switching system was invalid, and plaintiff appealed. The Court of Appeals, Pauline Newman, Circuit Judge, held that defendant failed to establish by clear and convincing evidence that claims contained in reissue patent no. 31,144 for a multistation telephone switching system were invalid for obviousness.

Vacated and remanded.

1. Judgment ⇐650

For collateral estoppel to arise the prior decision need not have been final in the sense of 28 U.S.C.A. § 1291 pertaining to appealability of final orders but the prior adjudication must have been sufficiently firm to be accorded conclusive effect.

2. Patents ⇐327(1)

District court's decision on the invalidity of original patent claims, a decision not final, not certified, not appealed, and mooted by subsequent events, did not collaterally estop patent owner from appealing a ruling on the invalidity of claims of reissue patent.

3. Patents ⇐147

It was not correct to weigh reissue claims against original claims on issue of obviousness where the reissue claims were not substantially identical to the original claims. 35 U.S.C.A. § 103.

4. Patents ⇐147

When a patent has been reissued with claims that are not substantially identical to original claims, invention as a whole, as now claimed, must be evaluated in terms of obviousness. 35 U.S.C.A. § 103.

5. Patents ⇐314(5)

Obviousness vel non under 35 U.S.C.A. § 103 is a question of law, whose conclusion requires preliminary determination of several underlying factual issues relating to scope and content of the prior art, differences between prior art and claimed invention as a whole, level of ordinary skill in

lation, and they are not parties to this appeal.

* The complaint against Robert O. Carpenter and Turret Equipment Corp. was dismissed by stipu-

the art at time invention was made, and so-called "secondary considerations" that reflect the contemporaneous response to the invention.

6. Patents ⇐16(3)

Those charged with determining compliance with 35 U.S.C.A. § 103 are required to place themselves in minds of those of ordinary skill in the relevant art at time invention was made, to determine whether that which is now plainly at hand would have been obvious at such earlier time; the invention must be viewed not with the blueprint drawn by inventor, but in the state of the art that existed at the time and must be evaluated not through eyes of the inventor, who may have been of exceptional skill, but as one of ordinary skill.

7. Patents ⇐112.1, 144

A duly issued patent is presumed valid, as is a duly reissued patent and burden of proving otherwise resides with person challenging its validity. 35 U.S.C.A. § 282.

8. Patents ⇐36(2), 112.1, 144

Examiner's decision, on an original or reissue application, is never binding on the court, however, it is evidence the court must consider in determining whether the party asserting invalidity has met its statutory burden by clear and convincing evidence.

9. Patents ⇐148

Upon reissue, burden of proving invalidity is made heavier; reissue patent reaches court clothed in a statutory presumption of validity and clear and convincing evidence is required to surmount that presumption.

10. Patents ⇐147

Trial court, in determining the validity of a reissue patent for a multistation telephone switching system, erred in reconstructing the system, using the blueprint of the patent owner's claims.

11. Patents ⇐16.29

District court erred in concluding as a matter of law that claim 1 of reissue patent no. 31,144 for a multistation telephone

switching system was substantially identical, for purposes of determining obviousness, of its parent claim.

12. Patents ⇐16.1, 26(1)

Obviousness must be determined with respect to the invention as a whole and that is essential for combination inventions. 35 U.S.C.A. § 103.

13. Patents ⇐26(1)

When prior art references require selective combination by the court to render obvious a subsequent invention, there must be some reason for the combination other than hindsight gleaned from the invention itself; there must be something in the prior art as a whole to suggest desirability, and thus the obviousness, of making the combination. 35 U.S.C.A. § 103.

14. Patents ⇐36.2(1)

Evidence of commercial success, when present, must be considered and afforded appropriate weight in determining obviousness of patent claims. 35 U.S.C.A. § 103.

15. Patents ⇐16.29

Defendant failed to establish by clear and convincing evidence that claims contained in reissue patent no. 31,144 for a multistation telephone switching system were invalid for obviousness. 35 U.S.C.A. § 103.

Alfred P. Ewert, Morgan, Finnegan, Pine, Foley & Lee, New York City, argued for plaintiff-appellant. With him on the brief were Jerome G. Lee, Robert A. Molan and Richard J. McGrath.

Howard Karasik, Sherman & Citron, P.C., New York City, of counsel.

Lawrence G. Kurland, Stiefel, Gross, Kurland & Pavane, P.C., New York City, argued for defendants-appellees Feil, et al.; Lance J. Lieberman, Daniel L. Dolgin, Towne, Dolgin, Sawyer & Horton, New York City, Peter R. Stern and Theodore S. Steingut, Berger, Steingut, Weiner, Fox & Stern, New York City, were on the brief.

Before DAVIS, SMITH, and NEWMAN,
Circuit Judges.

PAULINE NEWMAN, Circuit Judge.

Interconnect Planning Corporation (IPC) appeals from the summary judgment of the United States District Court for the Southern District of New York, *Interconnect Planning Corp. v. Feil*, 587 F.Supp. 1495, 223 USPQ 961 (S.D.N.Y.1984), holding invalid all the claims of IPC's Reissue Patent No. 31,144 entitled "Multi Station Telephone Switching System", invention of Thomas E. Feil, for failure to meet the conditions for patent validity under 35 U.S.C. § 103, and dismissing IPC's count for patent infringement. We hold that invalidity under § 103 has not been proven, as a matter of law. We vacate the summary judgment of invalidity and dismissal of the infringement count, and remand to the district court.

Background

The claims of Reissue Patent No. 31,144 are for certain telephone systems known as "trader turrets", which are multi-line telephone consoles used by the financial community in trading networks for securities, commodities, currency, and the like. The purpose of these systems is to facilitate concurrent telephone connections for traders requiring multiple sources of price information, conducting multiple transactions, and generally meeting the communication demands of busy, often hectic, financial trading enterprises. Trading rooms may house a hundred or more trader turrets.

Because of the large number of lines and connections required and the specific needs of these communication networks, these systems are complex. A high degree of reliability is required in their operation, because even momentary failures can be extremely costly.

The record shows that the Feil trader turrets rapidly achieved commercial success, displacing other systems then in use. IPC attributes the success of the Feil invention to its novel system "architecture",

which enabled ease of operation, high capacity, and improved reliability over the systems then available. IPC's sales of the Feil trader turrets, according to the record, grew from \$320,000 for 20 units in 1974, its first year, to \$27,900,000 for 3500 units in 1983.

Thomas Feil, the inventor, was formerly an officer and part owner of IPC. In 1977 Mr. Feil formed the defendant company V Band Systems, Inc., and in 1980 Mr. Feil left IPC and joined V Band, of which he is president and chief executive officer. Defendants make and sell the trader turrets that are here accused of patent infringement.

On November 21, 1980 IPC filed suit in the Southern District of New York asserting infringement of U.S. Patent No. 3,991,282 (the '282 patent), invention of Thomas Feil. Defendants Feil and V Band raised the defense this patent was invalid in terms of 35 U.S.C. § 103. IPC's count for unfair competition was dismissed by the court and is not before us. Various counterclaims were separated and are apparently still pending.

In May of 1981 IPC filed in the U.S. Patent and Trademark Office (the PTO) an application to reissue the '282 patent. IPC cited to the examiner articles by M.E. Ozenberger and W.H. Keith, both of the Bell Telephone Laboratories, on which articles defendants were relying before the district court, and which had not previously been before the examiner. The district court refused to stay the action before it pending completion of the reissue examination, and therefore the reissue examination was suspended by the PTO in accordance with its rules. On defendants' motion for summary judgment, the district court on June 1, 1982 held all claims of the '282 patent invalid for obviousness under 35 U.S.C. § 103. *Interconnect Planning Corp. v. Feil*, 543 F.Supp. 610, 614-19, 215 USPQ 734, 736-41 (S.D.N.Y.1982).

Following this decision, at IPC's request the PTO resumed examination of the reissue application. The court's decision was provided to and considered by the examin-

er. A supplemental reissue declaration by IPC referred to this decision as a basis for the reissue application. The '282 patent was surrendered, and on February 8, 1983 the PTO granted the reissue patent, RE 31,144, IPC having restricted its claims in various ways and having overcome the newly cited prior art.

Defendants moved for summary judgment of invalidity of the reissue patent, asserting collateral estoppel based on the court's decision on the '282 patent, and also asserting invalidity under 35 U.S.C. § 103. IPC resisted the motion, and the parties' memoranda, affidavits, depositions, and other documents are of record. For reasons similar to those of the 1982 decision, the motion for summary judgment was granted on June 20, 1984.

That decision, holding all of the reissue claims invalid, was certified and made final under Fed.R.Civ.P. 54(b), with instructions by the court that IPC "attempt to have any appeal ... heard at the same time and before the same panel" as any appeal from a decision on the same patent by the United States District Court for the District of New Jersey.¹ We agreed. Both appeals are decided this day.

Although both appeals involved similar issues and argument, specific to the New York suit are certain procedural issues, as discussed *infra*.

Collateral Estoppel

Defendants argue that IPC's appeal rights are curtailed on the basis of collateral estoppel. Two separate but related issues of estoppel are raised, both arising out of the district court's 1982 decision on the '282 patent.

A.

Defendants assert first that IPC can not now appeal from or argue those aspects of the 1984 decision on the reissue patent which are "common to" the 1982 decision on the '282 patent, on the ground that

those aspects could have been appealed earlier, and that it is too late to do so now. IPC asserts in response that (1) the issues are not the same, (2) a different patent is involved, and (3) the 1982 decision was not final.

[1,2] Considering the finality issue, for collateral estoppel to arise the prior decision need not have been final in the sense of 28 U.S.C. § 1291 but, in the words of the Restatement, the prior adjudication must have been "sufficiently firm to be accorded conclusive effect". Restatement (Second) of Judgments § 13 (1982). Sufficient firmness, according to the Restatement, requires that the party against whom the estoppel is asserted have had the right, even if not exercised, to challenge on appeal the correctness of the earlier decision. Restatement (Second) of Judgment, § 13 reporter's note comment f (1982). Defendants argue that IPC had three such opportunities: appeal under 28 U.S.C. § 1292(a)(1), which governs appeals from interlocutory orders involving injunctions; appeal under 28 U.S.C. § 1292(c)(2), which governs appeals in patent infringement cases final except for an accounting; and appeal under Fed.R.Civ.P. 54(b), which governs judgment on fewer than all of multiple claims in an action.

None of these situations controls the case before us. 28 U.S.C. § 1292(a)(1) relates to orders involving injunctions, and although defendants argue that IPC's complaint necessarily invokes this section, this does not impart automatic appealability to interlocutory orders that do not involve injunctions. As for 28 U.S.C. § 1292(c)(2), the district court's judgment was not final except for an accounting, in light of the pendency of counterclaims. 9 J. Moore, B. Ward, & J. Lucas, *Moore's Federal Practice*, ¶ 110.19[4], at 220 (1985). Fed.R.Civ. Proc. 54(b) requires that the court have expressly directed entry of a final judgment, and that "[i]n the absence of such determination and direction, any [decision] which adjudicates fewer than all the claims

1. *IPC Communications, Ltd. v. Standard Teleservices Supply, Inc.*, No. 81-1832D (D.N.J.1984)

(unreported), *vacated and remanded*, No. 84-1599 (Fed.Cir.1985) (unreported).

... shall not terminate the action as to any of the claims". See also 6 Moore's Federal Practice ¶ 54.42, at 813.

Neither IPC nor the defendants asked the district court to enter a final judgment on its decision holding the '282 patent invalid, and the court did not do so. Defendants assert, however, that IPC should now be estopped because it did not move for finality of the ruling nor request that the judgment be certified for interlocutory appeal. An application for certification is by no means certain to be granted and, in this case, IPC's eventual request for certification of the original decision was opposed by defendants and was refused by the court.

The law of collateral estoppel is not intended to penalize a party for declining to try to take a piecemeal appeal. Further, the '282 patent had been placed in reissue, and an appeal on the merits of patent claims for which reissue was being sought would have been a meaningless exercise, as may have been recognized at the time.

We conclude that the district court's 1982 decision on the '282 patent claims, a decision not final, not certified, not appealed, and mooted by subsequent events, lacks collateral estoppel effect for the purpose urged by defendants. The issue here on appeal is the validity of the claims of the reissue patent, an issue that did not exist at the time of the decision on validity of the '282 patent claims. There is no estoppel against appellate review of all aspects pertinent to the decision on the reissue claims. 1B Moore's Federal Practice ¶ 0.441[3.-3], at 737.

B.

IPC asserts that the district court incorrectly invoked collateral estoppel when it analyzed the reissue claims by comparing them with the original claims of the '282 patent, then applying prior art only to the differences between the reissue claims and the original claims. Our predecessor court, the U.S. Court of Claims,² has confronted

related situations, wherein estoppel was raised as to unadjudicated claims of a patent whose other claims had been adjudicated in an earlier action. The Court of Claims adopted a pragmatic approach, stating that the first step was to determine whether any new issues were raised as to the nonlitigated claims. In *Westwood Chemical, Inc. v. United States*, 525 F.2d 1367, 1375, 207 Ct.Cl. 791, 187 USPQ 656 (1975), adopting 186 USPQ 383, 389 (Ct.Cl. Tr.Div.1975), the court said:

Where obviousness is the basis for the prior invalidity holding, an inquiry into the identity of the validity issue is more properly phrased in terms of the factual inquiries mandated by *Graham v. John Deere Co.*, 383 U.S. 1, 17, 86 S.Ct. 684, 15 L.Ed.2d 545 (1966), as a prerequisite to such a validity determination.

Applying the *Graham* guidelines, the court said:

Thus, the inquiry should be whether the nonlitigated claims present new issues as to the art pertinent to the nonlitigated claims; as to the scope and content of that art; as to the differences between the prior art and the nonlitigated claims; and as to the level of ordinary skill in that art. If none of these inquiries raises any new triable issues, then the obviousness determination in the prior proceeding should be equally applicable to the nonlitigated claims.

Id. See also *Bourns, Inc. v. United States*, 537 F.2d 486, 210 Ct.Cl. 642, 199 USPQ 256 (1976), adopting 187 USPQ 174 (Ct.Cl.Tr.Div.1975); *Carter-Wallace, Inc. v. United States*, 496 F.2d 535, 538, 204 Ct.Cl. 341, 182 USPQ 172, 175 (1974) (in determining the applicability of the estoppel, the first consideration is "whether the issue of invalidity common to each action is substantially identical.").

The question of substantial identity of reissue claims arose in *Plastic Container Corp. v. Continental Plastics of Okla-*

Court of Claims and the Court of Customs and Patent Appeals.

2. In *South Corp. v. United States*, 690 F.2d 1368, 215 USPQ 657 (Fed.Cir.1982), the Federal Circuit adopted as precedent the decisions of the

homa, Inc., 607 F.2d 885, 203 USPQ 27 (10th Cir.1979), *cert. denied*, 444 U.S. 1018, 100 S.Ct. 672, 62 L.Ed.2d 648, 204 USPQ 696 (1980), wherein the court determined that the reissue claims were not substantially identical to the original claims, and therefore that collateral estoppel did not apply.

In *Bourns*, responding to plaintiff's argument that according collateral estoppel effect to non-identical adjudicated claims would amount to treating the claims previously held to be invalid as prior art, the court agreed that this would be inappropriate:

A domino approach in which each successively narrower claim is compared with the one before it, not with the prior art, is inappropriate since it improperly gives prior-art effect to the subject matter of an invalid claim. *In re Craig and Street*, Cust. & Pat.App., 411 F.2d 1333, 1335 (1969).

537 F.2d at 493, 187 USPQ at 179.

[3] The district court compared the reissue claims with the '282 claims, and erroneously concluded that reissue claims 1 through 6 were substantially identical to the original claims, and that reissue claims 7 through 9, although not substantially identical, involved some substantially identical "issues".

[4] This erroneous legal conclusion may have compounded the error in the next step, wherein the court compared the differences between the original and the reissue claims with prior art that was pertinent only to those differences, thus effectively giving the original claims prior art effect—the pitfall against which *Bourns* cautioned:

A claim may be invalid for obviousness under 35 U.S.C. § 103 but still describe a combination not found in the prior art. Moreover, it is well settled that each claim of a patent is entitled to a presumption of validity and is to be treated as a complete and independent invention. 35 U.S.C. §§ 282, 288. *Leeds & Catlin v. Victor Talking Machine Co.*, 213 U.S. 301, 319 29 S.Ct. 495, 53 L.Ed. 805 (1909); *Smith Industries International v.*

Hughes Tool Co., 396 F.2d 735, 736 (5th Cir.1968).

Id. When a patent has been reissued with claims that are not substantially identical to the original claims, the invention as a whole, as now claimed, must be evaluated in terms of 35 U.S.C. § 103. The original claims, whether valid or invalid, are not prior art against the reissued claims.

The Summary Judgment

The proceeding from which this appeal is taken was styled "summary", in that the court's decision was made on defendants' motion for summary judgment. The earlier decision on the '282 patent was also made on defendants' motion for summary judgment. IPC contends that the matter was inappropriate to summary judgment, in view of the presence of disputed issues of material fact.

Defendants Feil and V Band argued before the district court, and repeat before us, that no material fact is in dispute, that the questions before the district court and before us in this appeal are purely legal ones, and that the issue was properly dealt with summarily. In its discussion of reissue claims 7 through 9, which claims had no counterpart in the original patent, the district court referred to "claims and issues that have not yet been subjected to a full and fair adjudication", 587 F.Supp. at 1500, 223 USPQ at 965; the court viewed both proceedings as "full" as well as fair, a process not always accommodated by summary proceedings on a documentary record.

[5] Obviousness *vel non* under 35 U.S.C. § 103 is a question of law, whose conclusion requires preliminary determination of several underlying factual issues, as set out in *Graham v. John Deere Co.*, 338 U.S. 1, 69 S.Ct. 1434, 93 L.Ed. 1765, 148 USPQ 459 (1966). See also *Gardner v. TEC Systems, Inc.* 725 F.2d 1338, 1344-45, 220 USPQ 777, 782-83 (Fed.Cir.) (in banc), *cert. denied*, 105 S.Ct. 116, 105 S.Ct. 116, 83 L.Ed.2d 60, 225 USPQ 232 (1984). These factual issues relate to the scope and

content of the prior art, the differences between the prior art and the claimed invention as a whole, the level of ordinary skill in the art at the time the invention was made, and the so-called "secondary considerations" that reflect the contemporaneous response to the invention.

In reviewing IPC's assertions that there were genuine issues of material fact relating to the *Graham* inquiries, we have reviewed the submissions of the parties. Before the court, according to the record, were all the references cited as prior art; as well as the depositions of Examiner Randall P. Myers of the United States Patent and Trademark Office, engineer John Fitzmaurice of New York Telephone, and inventor/defendant Thomas E. Feil; and various documentary exhibits. Also of record were the affidavits of Alan R. Fitzpatrick, president of American Telecommunications Concepts; IPC's technical experts Dennis Maywald and Herbert Goldwag; Thomas P. Bradbury, vice president and treasurer of IPC; and extensive written submissions and arguments.

Although fact and opinion are intertwined in many of these documents, the factual considerations required by the *Graham* analysis appear to have been adequately presented in the record. The technological structure and operation of the devices of the prior art were not in material dispute,³ although there was strong dispute about the relationship of the teachings of the references to the problems solved by the Feil system, and the weight to be given to evidence of the Feil invention's commercial success.

The district court stated that expert testimony was unnecessary, *Interconnect Planning Corp. v. Feil*, 587 F.2d at 1497, 223 USPQ at 963, and held all of the reissue claims invalid. As will be discussed,

3. IPC argues that the district court should not have resolved any question of substantial identity between the claims of the original and reissue patents in defendants' favor because that is a contested fact question which should not have been resolved against the nonmovant, citing *Tee-Pak, Inc. v. St. Regis Paper Co.*, 491 F.2d 1193, 1200, 181 USPQ 75, 80 (6th Cir.1974).

we think that the district court reached this conclusion by incorrectly applying the law of 35 U.S.C. § 103.

35 U.S.C. § 103

[6] Those charged with determining compliance with 35 U.S.C. § 103 are required to place themselves in the minds of those of ordinary skill in the relevant art at the time the invention was made, to determine whether that which is now plainly at hand would have been obvious at such earlier time.

The invention must be viewed not with the blueprint drawn by the inventor, but in the state of the art that existed at the time.

The invention must be evaluated not through the eyes of the inventor, who may have been of exceptional skill, but as by one of "ordinary skill". See *Stewart-Warner Corp. v. City of Pontiac, Michigan*, 767 F.2d 1563, 1570, 226 USPQ 676, 680-81 (Fed.Cir.1985).

This is not a facile statutory interpretation. The quality of non-obviousness is not easy to measure, particularly when challenged years after the invention was made. That which may be made clear and thus "obvious" to a court, with the invention fully diagrammed and aided, in this case, by a hostile inventor seeking to eliminate his own invention, may have been a breakthrough of substantial dimension when first unveiled.

The judicial application of uniform standards for determining compliance with 35 U.S.C. § 103 is essential, because the technological incentives fostered by the patent system depend on consistent interpretation of the law. To this end, faithful adherence to the patent statute and guiding precedent fosters uniformity in result.

Under this court's precedent substantial identity between claims, a matter of claim interpretation, is a question of law. See, e.g., *Raytheon Co. v. Roper Corp.*, 724 F.2d 951, 956, 220 USPQ 592, 596 (Fed.Cir.1983), cert. denied, — U.S. —, 105 S.Ct. 127, 83 L.Ed.2d 69, 225 USPQ 232 (1984).

A.

[7] Following examination by the Patent and Trademark Office, a duly issued patent is presumed valid, as is a duly reissued patent. The burden of proving otherwise resides with the person challenging its validity. 35 U.S.C. § 282.

This statutory presumption derives in part from recognition of the technological expertise of the patent examiners. A reissue application receives a fresh examination, normally concentrated on those references and reasons that occasioned its filing. The record shows that this reissue application received a supplemental internal review by three examiners because it was involved in litigation.

[8] Although IPC's view is incorrect that the PTO's decision must be given controlling weight, we do agree that the examination procedure and result should be given appropriate consideration and due weight by the court. As stated in *Fromson v. Advance Offset Plate, Inc.*, 755 F.2d 1549, 1555, 225 USPQ 26, 31 (Fed.Cir.1985), "[t]he Examiner's decision, on an original or reissue application, is never binding on the court. It is, however, evidence the court must consider in determining whether the party asserting invalidity has met its statutory burden by clear and convincing evidence".

[9] Upon reissue the "burden of proving invalidity was made heavier", as stated in *Fromson, supra*. This burden must be met by the party asserting invalidity. The district court here relied on the identical references that had been before the reissue examiners, and disdaining the need for expert testimony, reached a different conclusion in law. Although we affirm the obligation of the district court to reach an independent conclusion, the reissue patent reaches the court clothed in a statutory presumption of validity, and clear and convincing evidence is required to surmount this presumption. *American Hoist & Derrick Co. v. Sowa & Sons, Inc.*, 725 F.2d 1350, 1359-60, 220 USPQ 763, 770 (Fed. Cir.), *cert. denied*, — U.S. —, 105 S.Ct. 95, 83 L.Ed.2d 41, 224 USPQ 520 (1984).

B.

The court referred to the content of the prior art references in broad terms, occasionally using the title of a reference to explain its pertinence. In this crowded art of telephone systems, as IPC correctly pointed out, it is not enough to show that each of the components used by Feil was known, and had been used in other telephone systems. Feil did not claim to have invented any of the components of his claimed system.

[10] From its discussion of the prior art it appears to us that the court, guided by the defendants, treated each reference as teaching one or more of the specific components for use in the Feil system, although the Feil system did not then exist. Thus the court reconstructed the Feil system, using the blueprint of the Feil claims. As is well established, this is legal error. *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 774, 218 USPQ 781, 791 (Fed.Cir.1983), *cert. denied*, — U.S. —, 104 S.Ct. 1284, 79 L.Ed.2d 687, 224 USPQ 520 (1984).

Illustrative is the court's analysis of reissue claim 1. Pertinent is not only its analysis of the differences between the reissue claim and the prior art, but also the differences between the reissue claim and the original claim. In claim 1, matter enclosed in brackets appeared in the original claim but forms no part of the reissue claim, and matter printed in italics was added by reissue:

1. For a telephone system in which telephone communication is capable of being established for each telephone station of a plurality of telephone stations over a standard telephone line by directly connecting each telephone station to a selected standard telephone line of a plurality of standard telephone lines, each of said plurality of standard telephone lines capable of being directly connected to each of said plurality of telephone stations, an improvement comprising:
a plurality of pairs of contacts, with respective pairs of said contacts being

- connected with respective ones of said standard telephone lines for allowing said communication;
- a plurality of relay coils, with respective ones of said relay coils controlling respective pairs of said contacts to be opened or closed;
- a plurality of sets of *non-locking* pushbutton [switch means] *switches* with each set of pushbutton [switch means] *switches* connected to respective ones of said telephone stations with respective ones of said pushbutton [switch means] *switches* of said sets of pushbutton [switch means] *switches* corresponding to respective ones of said standard telephone lines and being connected with respective ones of said relay coils and being depressed for energizing a selected one of said relay coils for closing a corresponding pair of contacts to allow said telephone communication; [and]
- an *electronic holding circuit for each of said relay coils, said holding circuits being operative to establish a held state after initial energization of the associated relay coil by momentarily depressing the associated pushbutton switch, and to maintain said corresponding pair of contacts closed while in the held state;*
- a *logic circuit for each station connected to said holding circuits to detect conditions for releasing the held state;*
- each of said stations comprising [first light display means] *a set of status lights*, connection means connecting corresponding pushbuttons of said sets of pushbutton [switch means] *switches* in each of said stations and to said [first light display means] *status lights* for energizing said [first light display means] *status lights* in each station to display the status of each of said plurality of standard telephone lines in each of said stations,
- said station further comprising [first light display means] *an active line in-*

dicator separate from said status lights connected to said pushbutton [switch means] *switches* for identifying the standard telephone line of said *plurality of standard telephone lines* that the telephone station is using for said telephone communication.

[11] Reissue claim 1 was held invalid on two grounds. The first ground was that it was substantially identical to claim 1 of the '282 patent, and thus invalid on the basis of collateral estoppel. The court in its 1982 decision referred to Carter U.S. Patent No. 3,150,238 and Foulkes U.S. Patent No. 3,757,056 as disclosing "non-locking buttons, relay coils and pairs of contacts" as applied to the original claim 1. In the 1984 decision the court stated that "Claim 1 has not been changed in such a way that alters the above finding of disclosure by prior art". 587 F.Supp. at 1499, 223 USPQ at 964. This treatment of the reissue claim is not supported by the claim content, as will be apparent from the court's further discussion of claim 1.

As the second ground for its holding of invalidity the court analyzed the changes made by reissue. The court identified three areas as *new* to reissue claim 1, and applied five references to these areas as follows: "See Defendants' Exhs. C13, D4-D6 (non-locking buttons); Defendants' Exhs. C4, C7 (holding circuits); Defendants' Exhs. C16, C13 (separate active lines)." *Id.* at 1499, 223 USPQ at 964 (footnotes omitted).

The first set of cited exhibits refers to articles by Keith, "A New Switching System for 'Right of Way' Companies", *Bell Laboratories Record*, Apr. 1968, and Ozenberger, "Voice Communication System for Air Traffic Control", *Bell Laboratories Record*, May 1961, which the court stated taught the use of non-locking pushbuttons. The second set refers to the Carter patent, which the district court said teaches a "Relay Control Circuit" (the title of the Carter patent), and the Foulkes patent which "recites that '[e]ach of these [control] circuits may take any desired and presently known form ... to perform a recognized control

function ... evaluat[ing] the 'hold' feature'. *Id.* at 1499 n. 6, 223 USPQ at 946 n. 6. The third set of exhibits refers to Simon U.S. Patent No. 3,928,732, which the district court described by its title, "Extension and Line Indicating Display System for Key Telephone System", and Keith, which the district court stated "also discloses separate active lines". *Id.* at 1499 n. 7, 223 USPQ at 964 n. 7.

The court's analysis of the scope of the new material in reissue claim 1 in itself shows the error in the court's conclusion that as a matter of law reissue claim 1 is substantially identical to its parent claim. The claim limitations of the electronic holding circuits for each relay coil, the logic circuit, and separate active line indicator, in combination with the non-locking pushbutton switches connected to the relay coils, were added by reissue. Observing these differences, their relationship to the invention as a whole, and the prior art, we conclude as a matter of law that reissue claim 1 is not substantially identical to the original claim. The 1982 decision, which was directed to the original claims, does not apply to the reissue claims. Collateral estoppel as a basis for the court's holding of invalidity is not supported in law.

Having determined that a reissue claim is not substantially identical to the parent, the parent claim is of no further moment. As stated in *Wayne-Gossard Corp. v. Moritz Hosiery Mills, Inc.*, 539 F.2d 986, 991, 191 USPQ 543, 546-47 (4th Cir.1976), "the original claim was at an end, denuded of all potency save as a bench mark of interpretation, at the time of the reissue's infringement."

The original claim is not prior art against the reissue claim. It is not correct to weigh the reissue claim against the original claim. It is not correct to weigh the changes in the reissue claim against the original claim. It is the reissue claim alone that is to be analyzed in accordance with the *Graham* guidelines, and the differences to be considered are the differences between the reissue claim as a whole and the prior art.

In the court's 1982 analysis of the original claims, to which the court referred in its 1984 decision, the court had identified "six principal features which plaintiff argues are not obvious" and explained why the court concluded that these features are obvious by referring to various prior art references showing various of the features in various contexts. *Interconnect Planning Corp. v. Feil*, 543 F.Supp. at 617, 215 USPQ at 739. As we have observed, it is the emphasis on the obviousness of "features", rather than the claimed telephone system as a whole, that constitutes the flaw in the application of section 103 to the Feil claims. As stated in *In re Shuman*, 361 F.2d 1008, 1012, 150 USPQ 54, 57 (CCPA 1966):

It is impermissible to first ascertain factually what appellants *did* and then view the prior art in such a manner as to select from the random facts of that art only those which may be modified and then utilized to reconstruct appellants' invention from such prior art.

The court in 1982 summarized its conclusion with respect to these six "features" by observing (1) that although the pairs of contacts and relay coils "is not disclosed in either the Keith Article or the Ozenberger Article", the Foulkes and Carter patents do disclose them; (2) that Keith, Ozenberger, and Foulkes refer to pushbutton switches; (3) that Keith shows a set of display lamps although Ozenberger uses a single lamp, and that Paraskevagos (U.S. Patent No. 3,727,003) and Simon et al. show either a digital display or the incoming line number; (4) that Paraskevagos shows a decoder and that "the diode matrix was no mystery to one engineer" (Thomas Fitzmaurice, of Bell Labs, who testified that he readily understood the Feil system after he was shown it); (5) that Keith shows which lines are active; and (6) that the asserted unique master station hook up with blocking means is shown in Ozenberger and a Verdon patent (U.S. Patent No. 3,819,871). *Interconnect Planning Corp. v. Feil*, 543 F.Supp. at 617-19, 215 USPQ at 739-40.

In its 1984 decision the court added the additional citations of references pertinent to the changes in the reissue claims, as discussed above. As in its citation of references against the various features of the original claims, the court selected from each reference a feature or features that also appeared in the reissue claims. No reference, however, suggested the overall arrangement, the "architecture" of the Feil system.

IPC presented affidavit testimony explaining the references in the context of the state of the telephone systems art at the time, none of which testimony was controverted other than by attorney argument. The most advanced multi-line devices at the time the invention was made, according to this record, used the then state-of-the-art crossbar switching equipment, and electrical or mechanical interconnections or interlocks. The two Bell Labs publications of Keith and Ozenberger, on which defendants and the district court placed substantial emphasis, used crossbar switching. Feil did not.

Mr. Feil's affidavit filed with the district court states "The Ozenberger and Keith articles disclose what I thought I invented in 1974". Mr. Feil made no reference to the crossbar switches required by these references, and offered no discussion of either differences or similarities between his system and those of these references.

The Carter patent used relay switches in the telephone switching system it describes. Carter, of Bell Laboratories, taught the use of quick-release control relays in combination with slow-release work relays, to achieve the specific purposes desired by Carter. Carter also required use of a "locking chain" rather than independently operating relays, and a more complex communication path as compared with Feil's direct connections. Feil established multiple direct connections in a system where theretofore it was believed, according to the record, that crossbar switches would be required.

The Feil system eliminated both crossbar switches and mechanical interlocks or me-

chanically locking pushbuttons, and instead used relays, a well-known type of switch. But Feil avoided the need (of Carter) to establish potentially large numbers of contacts and operate a concomitantly large number of relays in series in order to connect stations within the system. As IPC's uncontroverted testimony shows, Feil avoided interconnections and interlocks, both of which, according to the Maywald affidavit, had previously been considered necessary to lock out faults. The Maywald affidavit stated that Carter's approach would be "impossible and impractical" in the trader turret application because "[t]o try and accurately control the release times of different relays over a long period of time would be virtually impossible considering the wear and deterioration of components" in a "trader turret network involving some 20,000 or more relays". Maywald's explanation of the technical operation of the references is uncontradicted, although defendants take issue in attorney argument with Maywald's conclusions.

The Foulkes patent, on which the district court also relies, described a "bipolar multiplexing circuit" based on a "contact tree" relay switching arrangement. Foulkes taught a telephone system that Maywald avers, without contradiction, "could not be realistically expanded into large systems like trader turrets". The district court did not explain how the Foulkes or other systems of different circuitry made obvious the different system of Feil's claims.

The Keith and Ozenberger systems, as previously discussed, are different systems from that of Feil. Like the systems of the other references, they contain some elements in common with that of Feil. The Ozenberger system, based on crossbar switches, was designed for air traffic control. The Keith system is described as tailored to the specific needs of "right-of-way" companies, and is a cordless system limited to up to eight consoles of up to a hundred lines. As Keith says, "[a] system of crossbar switches is the heart of the switching system". Neither Keith nor

replaced with relays and that the other changes be made to produce the admittedly different Feil system.

The novelty of the Feil system is not controverted by the defendants. Its value in trader turret systems has received the ultimate recognition, market success and imitation.

[12] 35 U.S.C. § 103 requires that obviousness be determined with respect to the invention as a whole. See, e.g., *Jones v. Hardy*, 727 F.2d 1524, 1528, 220 USPQ 1021, 1024 (Fed.Cir.1984); *W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1548, 220 USPQ 303, 309 (Fed.Cir.1983), cert. denied, 105 S.Ct. 172 (1984); *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1537, 218 USPQ 871, 877 (Fed.Cir.1983). This is essential for combination inventions, for generally all combinations are of known elements. *Environmental Designs, Ltd. v. Union Oil Co. of California*, 713 F.2d 693, 698, 218 USPQ 865, 870 (Fed.Cir.1983), cert. denied, — U.S. —, 104 S.Ct. 709, 79 L.Ed.2d 173, 224 USPQ 520 (1984).

[13] When prior art references require selective combination by the court to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gleaned from the invention itself. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577 & n. 14, 221 USPQ 929, 933 & n. 14 (Fed.Cir.1984). There must be "something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination". *Lindemann Maschinenfabrik GmbH v. American Hoist and Derrick Co.*, 730 F.2d 1452, 1462, 221 USPQ 481, 488 (Fed.Cir.1984).

Critical to the analysis is an understanding of the particular results achieved by the new combination. The claims here at issue are directed to a combination of known components of telephone systems in an admittedly new way to achieve a new total system. Neither the district court in its opinion, nor the defendants, identified

components be combined as they were by Feil or that such combination could achieve the advantages of the Feil system.

Not only must the claimed invention as a whole be evaluated, but so also must the references as a whole, so that their teachings are applied in the context of their significance to a technician at the time—a technician without our knowledge of the solution. The defendants propounded and the district court appears to have followed an analytical method that well illustrates the "mosaic" analogy discussed in *W.L. Gore & Assocs.*, 721 F.2d at 1552, 220 USPQ at 312, where this court said:

[T]he claims were used as a frame, and individual, naked parts of separate prior art references were employed as a mosaic to recreate a facsimile of the claimed invention.

Defendants refer to the decision of the Supreme Court in *Sakraida v. Ag Pro, Inc.*, 425 U.S. 273, 96 S.Ct. 1532, 47 L.Ed.2d 784, 189 USPQ 449 (1976). As the Court there held, Sakraida's combination of old elements to wash barn floors with flowing water did not produce a new or different function, and affirmed the district court's holding that "'all of the elements of [the combination] are old ... and the combination of them ... being neither new nor meeting the test of non-obviousness.'" *Id.* at 274, 96 S.Ct. 1533-34, 189 USPQ at 450. In the Feil invention the combination was admittedly new, and it produced a new system having theretofore unavailable attributes.

Recognizing the difficulty of casting one's mind back to the state of technology at the time the invention was made, courts have long recognized the usefulness of evidence of the contemporaneous attitude toward the asserted invention. A retrospective view of the invention is best gleaned from those who were there at the time. Mr. Feil, the inventor impugning his own invention, now avers that he did no more than did the prior art, specifically the Keith and Ozenberger articles. Mr. Feil's disavowal of his invention is staunch, although

fore he left IPC, on the reaction of Bell Labs' engineer at that earlier time:

He [Fitzmaurice] showed too much enthusiasm. I mean, he was really excited by the thing. Like this is incredible. You guys are geniuses. You're 50 miles ahead of Bell Labs. (App.Vol. VI, F357).

You know what he said. He said You're 50 miles ahead of Bell Lab? He said "miles", not years, he made it in miles. You're 50 miles ahead of the Bell Labs. (App.Vol. VI, F355).

Mr. Elia of the Republic Bank, one of IPC's customers, attested:

Upon viewing the equipment, the AT & T people indicated that it was unbelievable. They did not think it could be done. They were surprised that it was done. (App.Vol. VI, F360).

[14] Although the district court remarked in its 1982 decision that evidence of commercial success "cannot be afforded any weight" "in light of my finding of obviousness", 543 F.2d at 619, 215 USPQ at 741, such evidence when present must be considered and afforded appropriate weight. *Simmons Fastener Corp. v. Illinois Tool Works, Inc.*, 739 F.2d 1573, 1575, 222 USPQ 744, 746 (Fed.Cir.1984), *cert. denied*, — U.S. —, 105 S.Ct. 2138, 85 L.Ed.2d 496 (1985); *Jones v. Hardy*, 727 F.2d at 1530, 220 USPQ at 1026; *Medtronic, Inc. v. Cardiac Pacemakers, Inc.*, 721 F.2d 1563, 1575, 220 USPQ 97, 105 (Fed.Cir. 1983); *Stratoflex, Inc.*, 713 F.2d at 1538-39, 218 USPQ at 879; *In re Sernaker*, 702 F.2d 989, 996, 217 USPQ 1, 7 (Fed.Cir. 1983); *In re Mageli*, 470 F.2d 1380, 1383, 176 USPQ 305, 307 (CCPA 1973). IPC offered affidavit and deposition evidence, by two experts in telephone systems and by a Bell system engineer knowledgeable in the field of trader turrets. Their uncontroverted testimony was to the effect that the Feil system was perceived at the time as an exceptional technological achievement.

[15] The requirement that "secondary considerations" be considered in determinations under section 103 aids in evaluating the state of the art at the time the inven-

tion was made. *In re Piasecki*, 745 F.2d 1468, 1475, 223 USPQ 785, 790 (Fed.Cir. 1984). It is not pertinent that the invention was easily understood after it was made—a factor that appears to have been considered significant by the district court, *see* 543 F.Supp. at 619, 215 USPQ at 741—but whether it would have been obvious to make the invention at the time. Giving due weight to the market success and contemporaneous reaction to the Feil trader turret system, the record does not contain clear and convincing evidence that the Feil invention of the reissue claims would have been obvious to one of ordinary skill in this art at the time the invention was made.

Reissue claims 2-9 are either dependent on reissue claim 1, include similar limitations, or include additional limitations. Although each claim has been considered separately, they need not here be treated in redundant detail. For each claim we are compelled to the conclusion that the burden of proving invalidity by clear and convincing evidence has not been met.

The summary judgment of invalidity of Reissue Patent No. 31,144, in terms of 35 U.S.C. § 103, is vacated, as is the dismissal of the infringement claim. The case is remanded to the district court for further proceedings consistent herewith.

VACATED and REMANDED.



KIMBERLY-CLARK
CORPORATION, Appellant,

v.

H. DOUGLAS ENTERPRISES,
LTD., Appellee.

Appeal No. 85-1261.

United States Court of Appeals,
Federal Circuit.

Oct. 11, 1985.

Owner of registered trademark of
"HUGGIES" disposable diapers opposed